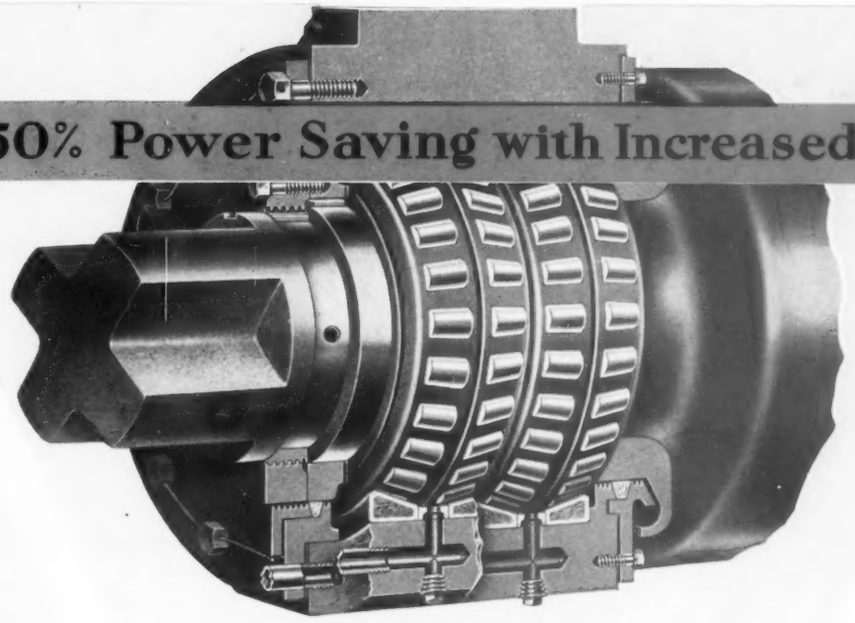
TECHNICAL ROOM
GENERAL LIBRARY
NOV 30 1931

STEEL

For forty-eight years—IRON TRADE REVIEW

June 4, 1931

Up to 50% Power Saving with Increased Tonnage



Don't you want these Timken benefits in your mills?

Rolling mills equipped with Timken Heavy Duty Roll Neck Bearings are rolling up phenomenal production records in some of the country's largest steel plants . . . low-cost records . . . high-tonnage records. Power savings as high as 50%; tremendous lubricant economy; load carrying capacities of over 8 million pounds; service life measured in hundreds of thousands of tons.

You can't *afford* to ignore these Timken profit-protecting benefits.

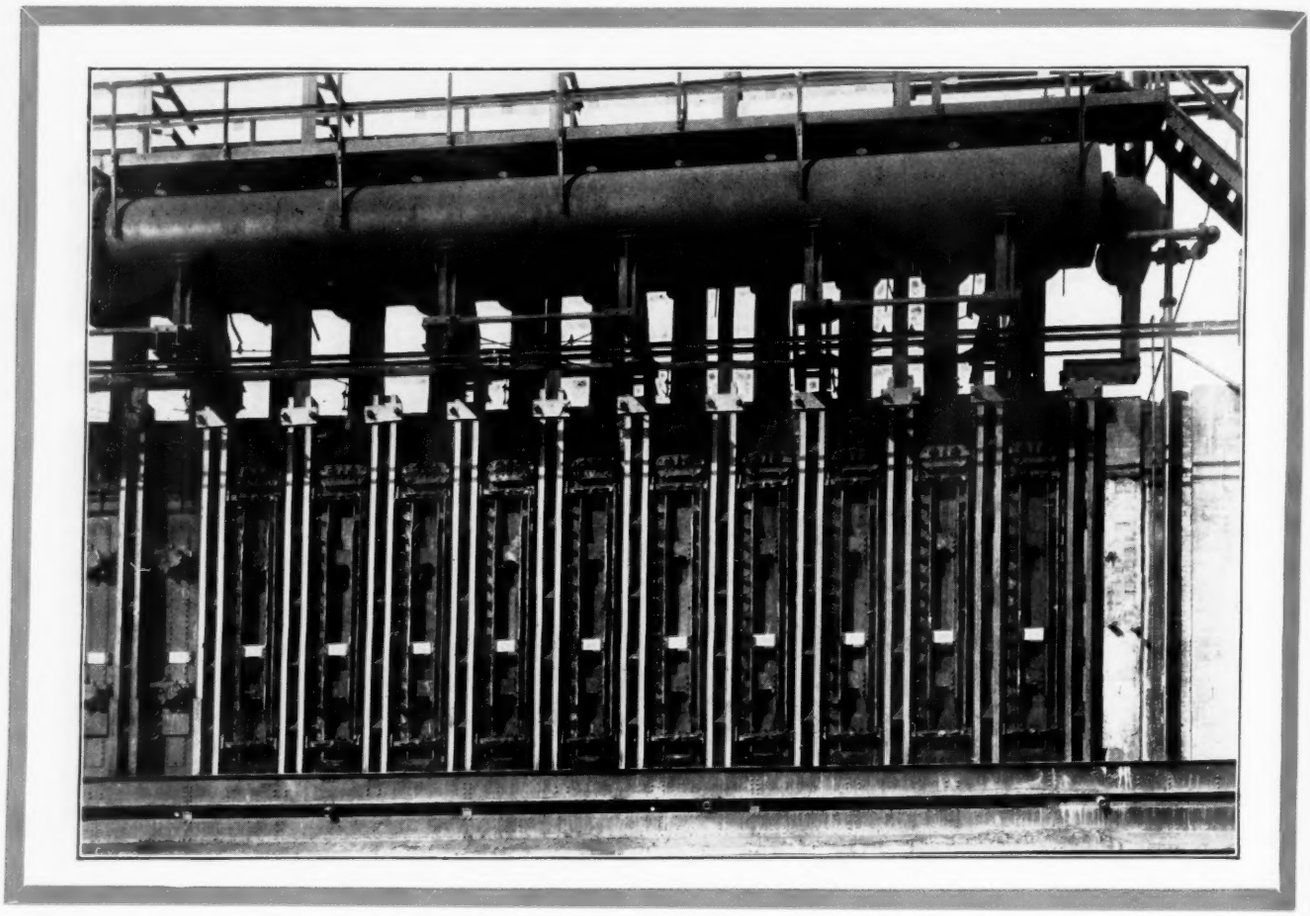
THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

Iron and Steel Exposition, Cleveland

Spaces No. 144, 148, 158

Tapered Roller
TIMKEN BEARING
EQUIPPED

MODERNIZATION OF BY-PRODUCT COKE PLANTS



- When Koppers Plants supplement or partially replace existing equipment, they bring new vigor to the *entire* coke and gas producing structure. Whether the addition consists of Becker Ovens, By-Product Apparatus, or a Material Handling Plant, its relation to the customer's equipment and business is carefully worked out in terms of current operating and sales practice.

- The result is a unified, revitalized plant that makes new records in production and efficiency.

- Our engineers will be glad to help you consider the application of Koppers Plants to your coke and gas requirements.

THE KOPPERS CONSTRUCTION COMPANY

KOPPERS BUILDING PITTSBURGH, PA.

Vol. 88, No. 23, June 4, 1931, issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under the act of March 3, 1879. Subscription $6 a year in U. S. and Canada; foreign £2:0:0; single copies, 25c.

STEEL

PRODUCTION

PROCESSING

DISTRIBUTION

USE

EDITORIAL STAFF

E. L. SHANER
EDITOR

ASSOCIATE EDITORS

E. C. BARRINGER — E. F. ROSS
A. J. HAIN — J. D. KNOX
G. H. MANLOVE — W. H. LLOYD
GUY HUBBARD

New York

E. C. KREUTZBERG — B. K. PRICE
H. R. SIMONDS

Pittsburgh — W. G. GUDE

Chicago — F. B. PLETCHER

Washington — L. M. LAMM

London — VINCENT DELPORT

ADVERTISING STAFF

G. O. HAYS
BUSINESS MANAGER

New York

J. F. AHRENS — E. W. KREUTZBERG

Pittsburgh

S. H. JASPER — C. B. HUMPHREY

Chicago

L. C. PELOTT — C. A. WARDLEY

Cleveland

JOHN HENRY — R. C. JAENKE

F. F. LIGHT, *Circulation Manager*

CONTENTS

June 4, 1931

THIS WEEK IN STEEL 21

Distances Handicap Soviet Steel Program 23
Reports Trade Bodies Ease Strain of Falling Prices 24
Tariff Has Little Effect on Foreign Trade, Says Farrell 25
May Pig Iron Rate Turns Down 26
Imports Increase, Exports Decline in April 28
Current Statistics of Steel Industry 31

Industrial Men in the Day's News 29
Obituary 31
Mirrors of Motordom 32
Here and There in Industry 33

EDITORIAL—Iron Ore Survey Important 34
THE BUSINESS TREND 35

Coreless Induction Furnace Larger; Lining Improved 39
Nickel-Clad Steel Affords Noncorrosive Surface 44
Welder Produces Pipe in 2 to 16-Inch Diameters 50
Corrosion of Pipe Lines Takes Large Annual Toll 53
Spherical Steel Storage Tank Blown to Pieces in Test 55
Steel Industry Owes Growth to Ingenuity of Engineers 55
Scanning the Technology of Steel 61
Bankers Must Recognize Importance of Industrial Equipment 65
Machine Tools and Plant Equipment 65

MARKET SUMMARY 73
MARKET REPORTS AND PRICES 74-104
CONSTRUCTION AND ENTERPRISE 107
NEW TRADE PUBLICATIONS 112
WHERE-TO-BUY DEPARTMENT 113
ADVERTISERS' INDEX 144

STEEL is published every Thursday by PENTON PUBLISHING CO., Penton Building, Cleveland, O. C. J. STARK, President; J. D. PEASE, Vice President; F. V. COLE, Secretary. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association. Branch Offices: New York, 220 Broadway; Chicago, Peoples Gas building; Pittsburgh, Oliver building; San Francisco, Alto Building; Washington, National Press building; Cincinnati, Schmidt building; London, Caxton House, Westminster, S. W. 1.; Paris, 9 Rue de Londres; Berlin, Dahlmerstrasse 64 A, Lichterfeld-West. Subscription in the United States, Canada, Cuba and Mexico $6 per year; in Great Britain and European countries £2:0:0.

Entered as second class matter at post office at Cleveland under the Act of March 3, 1879.

Copyright 1931 by the Penton Publishing Co.

Neutral Knowledge and Advice On Steel Products and Their Applications

It is naturally difficult for one whose life interest and capital is tied up in the production of a certain product to speak in an unbiased way concerning it. It's the greatest thing in the world to him, and he presses its sale to the utmost, as he should.

Regardless of this fact, if you hear enough men tell the stories of their various products, it is still quite possible, though difficult, to come to the right decision. However, a more satisfactory method is to secure the advice and counsel of a large dependable steel-service organization that has no financial interest in the products sold, but, on the other hand, has several similar products for varying degrees of service.

For eighty-eight years we have listened to the stories and studied the merits, bought, sold, and used practically all iron and steel products from the mild steel grades to the newer alloys and stainless types. We are in a position to know, and we have chosen for our stocks, those products which have seemed the best suited to the practical requirements of our customers.

Thus we are in a unique position to advise with you on your iron and steel problems. Bring them to us. We can help you and perhaps save you money.

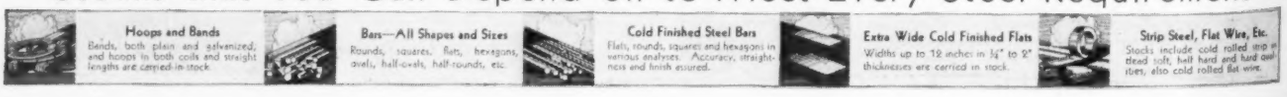
JOSEPH T. RYERSON & SON, INC.

Chicago, Milwaukee, St. Louis, Cincinnati, Detroit
Cleveland, Buffalo, Boston, Philadelphia, Jersey City

RYERSON

Beams and Heavy Structurals
Large stocks—all shapes, including special wide flange sections.
Channels, Angles, Tees and Zees
Both structural and bar sizes in all standard sections; also galvanized.
Rails, Splices, Spikers, Bolts, Etc.
New rails with all accessories—stocked for immediate shipment.
Plates
Standard steel plates, high carbon, Firebox steel, Armco Iron and diamond pattern.
Sheets
Sheets for every purpose—from plain black to Allegheny stainless, in a full range of sizes.

Stocks that You Can Depend on to Meet Every Steel Requirement


Hoops and Bands
Bands, both plain and galvanized, and hoops in both coils and straight lengths are carried in stock.
Bars—All Shapes and Sizes
Rounds, squares, flats, hexagons, ovals, half-ovals, half-rounds, etc.
Cold Finished Steel Bars
Flats, rounds, squares and hexagons in various analyses. Accuracy, straightness and finish assured.
Extra Wide Cold Finished Flats
Widths up to 12 inches in ¼" to 2" thicknesses are carried in stock.
Strip Steel, Flat Wire, Etc.
Stocks include cold rolled strip steel soft, half hard and hard coil tires, also cold rolled flat wire.

Volume 88 Number 23

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

WALL STREET'S pessimism may be as unreasoning now as its optimism in 1929 was naive, but enough business is developing in steel—particularly large projects—to disclose a strong basic underlying confidence. . . . Timid as money is, steel pipe line projects awarded this week (Page 83) exceeded 70,000 tons. . . . In two weeks bids will be in on two bridges, at San Francisco and Henderson, Ky., requiring (Page 78) over 133,000 tons of structurals. . . . The Pennsylvania railroad has committed itself (Page 77) for $16,000,000 worth of electric locomotives. . . . Steelworks operations hold (Page 80) at 41 per cent. . . . A decline of 3.9 per cent in pig iron production in May (Page 27)—the week's wet blanket—is not unseasonal.

Domestic Markets Good by Comparison

Foreign steel market news (Page 100) continues to sound a lower note than domestic markets . . . . On the Continent, some steel prices have broken through former lows . . . . Belgium is finding her Japanese and Indian business a broken reed . . . . Indeed, Japan herself is becoming an exporter and is beginning to supply enameled ware in some hitherto German markets. . . . As for the United States, the balance of foreign trade in April was still more unfavorable (Page 28), with exports declining and imports expanding. Comparing four months of 1931 with the corresponding months of 1930, imports have been only halved but exports quartered.

Home Needs To Absorb Russian Steel

In this dark night of business Russia stands out like a beacon—to some not a beacon of safety but a lure to treacherous economic waters. An analysis (Page 23) of the Soviets' 5-year steel program indicates no menace to foreign trade if the locations of the new steelworks be considered. One, 1200 miles east of Moscow, is at the source of iron ore; another, 2700 miles east of Moscow, is in a coal basin. In the United States it is 1200 miles from Mesabi to Pittsburgh, but 1000 miles is by water. Unless Russia deliberately sets out to "dump" iron and steel abroad, it is difficult to vision her as an export nation for some time.

Sources of Manganese Supply Change

While Russia is prosecuting her 5-year industrial program vigorously other nations are encroaching upon her manganese business . . . . Two cargoes of African manganese are due shortly (Page 77) at Atlantic ports. . . . Output of manganese ore in the United States (Page 77) in 1930 at 67,035 tons compared with 60,379 tons in 1929; imports declined from 664,269 tons in 1929 to 585,658 tons in 1930 . . . . Michigan, revaluing her deposits of iron ore for tax purposes,

Photo Courtesy Economic Review of Soviet Union

Intensification of the collective farming program of Russia enhances the value of American combines, one of which is here pictured being assembled by native Russian labor

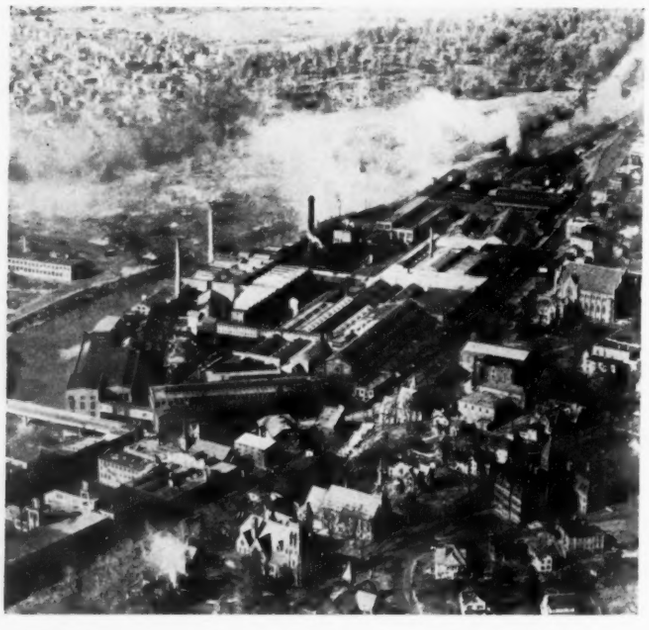
appraises them at $91,000,000, an increase of $1,000,000, one-fourth of which (Page 27) is ascribed to the Ford holdings.

Throw Up New Defenses Against Corrosion

One hundred million dollars is the annual toll corrosion is taking (Page 53) of the 300,000 miles of underground pipe in the United States, which is one reason why the bureau of standards is observing the behavior of protective materials in various soils . . . . On another sector the war against corrosion takes the form of coating one side of steel plate with nickel (Page 44). Processing the duplex plate to preserve the nickel surface involves practically the same procedure as when working ordinary steel, save that a means of heating to prevent injuring the coating must be provided. . . . Corrosion-resistant steels may have a rival in a process (Page 58) of electroplating with tungsten, much the same as with chromium. . . . This is typical of the engineering achievement which an electrical manufacturer recently "saluted" (Page 55) by radio.

Want Obsolescence in Balance Sheet

Machine tool builders believe a manufacturer's financial statement tells only half the story; they suggest (Page 65) that banks demand a statement of the condition of equipment—a plan which would reveal obsolescence more clearly. . . . Advances in welding almost automatically preclude an obsolescent condition. A new resistance-type electric welding machine joins by a buttweld two standard sections of steel pipe from 2 to 16 inches in diameter to make (Page 50) a single section 48 feet long . . . . There was no problem of obsolescence for the welded steel ball nearly 8 feet in diameter which one manufacturer spectacularly blew to destruction (Page 55) to test a new type of vessel for storing helium gas for the navy.



What the Ansonia, Conn., plant of the Farrel-Birmingham Co. Inc., manufacturer of chilled rolls and heavy machinery, looks like from the air

Notwithstanding, the Patient Lives

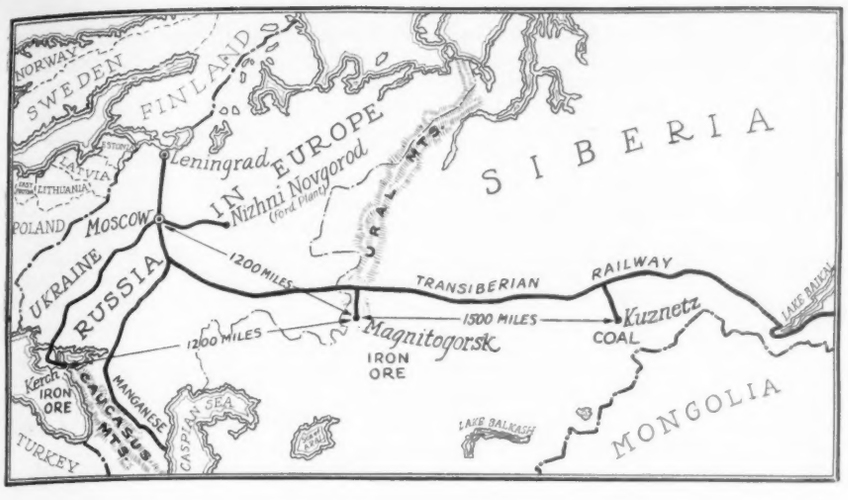
The vigil at the bedside of business is increasing, but the specialists continue to disagree. . . . At the American Iron and Steel institute clinic at New York a fortnight ago the patient was further harried by contradictions over wages and prices, with no beneficial results yet discernible (Page 73) . . . When foreign trade executives also convened at New York, last week, some business physicians were for removing the tariff but others (Page 25) held it to be of no more consequence to business than the appendix to humans. . . . In the Pacific Northwest diagnosis is being by-passed for genuine self-help in the form of a campaign (Page 94) to substitute wooden pipe for steel wherever possible, and succor the local lumber industry. By the same token, Pittsburgh should bar frame houses.

"Short Week, Same Pay", is Miners' Slogan

Coal miners appear to be taking seriously the advice from Washington, both from the department of labor and the American Federation of Labor, to become militant over wages. In West Virginia, miners have struck (Page 24) for a 5-day week with 6 days' pay, remniscent of the wartime demand for an 8-hour day with 10 hours' pay. . . . Labor, however, has no cause for alarm, according to the National Industrial Conference board, which finds (Page 24) that while "real" earnings declined 6 per cent in 1930 due to curtailed hours, there is little evidence of a concerted effort to reduce hourly rates. . . . A real gesture to labor is the offer (Page 78) of four Milwaukee structural steel fabricators to provide steel for a viaduct at cost in order to augment demand for home labor.

Sheet Makers Bend Before the Wind

New conditions, new competitive effort. . . . A sheet producer is concentrating production at its waterfront plant at Monroe, Mich., (Page 33) where it can float all its raw material in and some of its finished product out. . . . Another sheet interest is closing some of its specialty mills in order to take advantage (Page 31) of a modern, mechanized plant at Gary. . . . A third sheet manufacturer is endeavoring (Page 26), through a receiver, to emerge from deep financial water. . . . Two Middle West manufacturers of industrial equipment whose activities complement (Page 25) each other are merging.



Distances Handicap Soviet Steel Program; Deter Exports

OVERCOMING of land distances in assembling materials for production of pig iron and steel forms one of the greatest problems of the U.S.S.R., the Russian Soviet government, in its 5-year plan for the development of this branch of industry.

Compared with the parallel problem in the United States, the matter of distance assumes major proportions, complicated by necessity for tonnage movement of coal and iron ore by land instead of by water.

Another factor in which distance plays a large part is that new and large steel-producing developments by the Soviets are located far in the interior, 1200 to 1700 miles from the nearest ports through which exports might be shipped.

Steel production in Russia in the past has been confined to the area south of Moscow, reaching to the Black sea, iron ore and coal in the basin of the Donetz river making this a logical location. This is in the Ukraine, a district harried by wars from earliest history, possession of the iron ore and coal being bitterly contested.

Open Vast New Deposits

The Soviets have cast loose from the old things and have struck out boldly to distant sources. The largest undertaking in metallurgical development is to utilize vast deposits of iron ore and coal in the Ural and Siberian districts, where population is about six persons per square mile, compared with 66 persons per square mile in European Russia. But the ore and the coal are deposited in localities 1500 miles apart by rail, though relocation of the railroad is to reduce this to 1400 miles within a short time.

Construction is under way on two plants, one at Magnitogorsk, in the Ural region, under the shadow of Magnitnaya mountain, over the border in Siberia and 400 miles south of the main line of the Trans-Siberian railroad. This is some 1200 miles from Moscow and about the same distance from the Ukraine steel area. Deposits of iron ore running as high as 62 per cent iron are estimated 275,000,000 tons in Magnitnaya mountain.

The other plant is located at Kuznetz, some 1500 miles by rail east of Magnitogorsk, in a tremendous coal field which previously has not been exploited.

These operations are tied by the Trans-Siberian railroad, a single-track line, which is to be shortened by about 100 miles and part of which is to be double tracked. Along this line ore from Magnitogorsk will move eastward to Kuznetz and coal will move west as a back haul.

The steel plant at Magnitogorsk is being built by Arthur G. McKee & Co., Cleveland. The Freyn Engineering Co., Chicago, is furnishing technical assistance in construction of the Kuznetz plant. Coke plants are being erected at both locations and a crushing and concentrating plant at Magnitogorsk is under way to prepare ore for reduction. Koppers Construction Co., Pittsburgh, is building at Magnitogorsk a coke plant claimed by the Soviets as the largest in the world.

Cost of assembly of materials for production of pig iron at these plants will be largely determined by ability to transport the raw materials over 1400 miles of railroad. Ore at Magnitogorsk lies at the door of the plant and coal is equally accessible at the Kuznetz plant. The limestone needed for blast furnace operation is available nearby in both cases and offers no problem.

Compared with assembly costs in the United States, the Russian operation must move one constituent of the blast furnace charge 1400 miles by rail through a sparsely populated region, subject to severe winters. The longest haul of ore for blast furnaces in the United States does not exceed 1100 miles from the head of the lakes and this is by bulk freighters on the broad highways of the Great Lakes, almost without limit to the tonnage possible to move in the period of open navigation.

Kuznetz for Rail Improvements

Magnitogorsk and Kuznetz are in a sense parallel to the locations of steel producers in the Ohio and Pennsylvania steel area close to coal, and the Duluth furnaces and mills, close to ore. Ore moves south and east and coal is carried for the back haul.

It seems probable that the Kuznetz plant will be operated for some time in the production of steel for railroad use in bringing the Trans-Siberian road to better efficiency. Steel from that location can move in no direction except by rail and the distance to any consuming market or to ports at tidewater is so great export would seem practically impossible. From Kuznetz to Moscow is 2600 miles at best and to Petrograd is some 500 miles further.

From Magnitogorsk to Moscow is about 1200 miles and the more densely populated regions of Russia in Europe all lay at about that distance on the average from the Ural mills. While these two Siberian operations are the largest undertaken by the Soviets in development of steel production, the older steel area in the Ukraine is being developed by construction of new mills and considerable increase in equipment and capacity of older plants. These mills lie

FOURTH in a series bearing on the steel and iron development of Soviet Russia, this presents a picture of the handicaps imposed by great distances in assembling materials for steel production. Distance to tidewater from steel plants also is discussed as a factor limiting probability of heavy exports of steel.

Previous articles on Russian steel and iron developments appeared in STEEL as follows: March 19, page 15, general steel program; March 26, page 27, the program related to American industry; May 14, page 15, Europe's attitude toward probable effects of the program.

south of Moscow and are fairly near Black sea ports, which would give outlet for export in case the Soviets produced a surplus for that purpose.

The original plan for the Magnitogorsk plant called for capacity of 2,000,000 tons of ingots annually and revised plans have raised this to 4,000,000 tons annually. The Kuznetz plant is planned for capacity of 1,200,000 tons annually. Both plants are set for completion in 1931 and progress is being carried on fairly close to the schedule.

Coal Miners Strike for 5-day Week, 6-day Pay

Uniontown, Pa.—Strike of coal miners in this territory for a 5-day week with wages unchanged from a 6-day basis, is the most serious labor difficulty in any industry associated with steel during the present depression.

Organizers for mine workers' unions are concentrated at mines on the Baltimore & Ohio railroad in West Virginia, and on the Pittsburgh & West Virginia in the western Pennsylvania field. About 3000 miners in western Pennsylvania joined the strike June 1, while 2000 in the northern West Virginia field who went on strike last week returned to work Monday.

All mines on the Pittsburgh & West Virginia railroad were reported closed June 1, properties of the Pittsburgh Terminal Coal Co., which have been producing 5000 tons of coal daily, being the most seriously affected.

Advance-Rumely Approves Sale to Allis-Chalmers

Stockholders of Advance-Rumley Co., La Porte, Ind., have approved terms for the sale of all the company's assets, with some exceptions, to the Allis-Chalmers Co., Milwaukee. Among the exceptions is the plant at Battle Creek, Mich., valued at $742,000. Payment will be made in capital stock of Allis-Chalmers, not to exceed 114,500 shares. The purchaser has assumed possession of the plant at La Porte.

Real Weekly Earnings Down 5.9 Per Cent in 1930

Little evidence exists of a decided widespread reduction in wage rates, according to the National Industrial Conference board, New York. Average weekly earnings of all wage earners fully revealed the effects of the economic depression. The decline of weekly earnings of all wage earners in 24 manufacturing industries in 1930, as compared with 1929, averaged $2.68, or 9.4 per cent. The average was down $2.04 from 1928.

"The real significance of changes in money earnings," states the board, "is revealed only when these changes are considered in relation to the cost of living."

Its indexes of real earnings indicate that in 1930 as a whole real hourly earnings in 24 manufacturing industries were 4 per cent higher than in 1929, but real weekly earnings declined 5.9 per cent.

Railroads Must Make Own Case for Rate Adjustment

Washington—Refusal of the interstate commerce commisison May 26 to start on its own motion an investigation into the general railroad situation with the object of adjusting rates in order to augment railroad revenue is not construed as a hostile move.

The attitude of the commission throws back upon the railroads the entire initiative for any movement to increase rates. It would be possible for the railroads themselves to ask the commission to initiate a general investigation, a course which the commission's refusal to take the initiative has not closed, or the railroads could file individual, formal applications for rate adjustments.

Greater coordination of railroad facilities for the transportation of freight and passengers, thus enabling the railroad structure as a whole to render adequate service but at the same time effect marked economies in personnel and equipment, is being considered as an alternative to increasing rates.

Thus far the matter of reducing railroad wages has been kept in the background, although in some quarters it is believed no discussion of improving the railroads' financial setup will be conclusive without the consideration of wage rates.

Heads Rail Steel Bar Group For Two Decades

New York—Completing his twentieth year as president of the Rail Steel Bar association, Edward E. Hughes, Franklin Steel Co., Franklin, Pa., was re-elected to this position at the recent fortieth semiannual meeting of the association here. Other re-elections included all officers and executive committee members.

General discussion of business conditions indicated that although curtailed production exists uniformly throughout the industry, all mills are on a sound basis, in most cases supplementing reinforcing bar production with other products of rail steel to maintain tonnage at the current average percentage. It was stated that

Says Trade Bodies, Helping To Ease Strain of Falling Prices, Need Support

TRADE associations, through their closer coordination of business units, have been the most powerful agency preventing a price demoralization and consequently industrial ruin, according to Charles F. Abbott, executive director of the American Institute of Steel Construction, New York, who June 3 addressed the National Lime association meeting at White Sulphur Springs, W. Va.

Mr. Abbott reviewed the business depression and pointed out how a new level of commodity prices has been reached without panic or other serious distress which has so frequently marked previous business recessions.

"The idea of compulsion," said Mr. Abbott, "does not sit well with an American, and I venture to say that should we have a law such as exists in some other important commercial nations compelling membership in trade associations we might lose some of the vital force in our present system of industrial co-operation. Voluntary adhesion to a trade agreement is far more effective.

"But that does not blind us to the fact that the greatest weakness at present in our trade association movement is the inability of obtaining the membership of all who are profiting from the fruits of the co-operative. There are even in times less depressing than the present certain nonmembers who prefer to ride free. They take their profit from improvements in industries affected through trade associations without being willing to stand their part of the expenses.

"When business is depressed, through agencies outside the control of trade associations, the need for greater cohesion within the industry is even more essential. Especially is this true in the financing of a trade association if predicated upon a volume tax on the production as is nearly always the case. During the past year most trade associations have been forced to exercise economy without regard to the importance of the work they were engaged upon. And yet present conditions call for organized, intelligent, industrial leadership which is possible only through the trade organization."

public works are creating a large share of the present demand for reinforcement.

A committee on engineering was established, which, in co-operation with the committee on metallurgy, will assume direction of research activities affecting the various uses of rail steel bars and products.

A special meeting of the association will be held in August at Columbia Springs, Pa.

Dodge and Foote To Merge As Dodge-Foote Corp.

Chicago—Foote Bros. Gear & Machine Co., Chicago, manufacturer of gears and speed reduction units, is to be acquired by Dodge Mfg. Corp., Mishawaka, Ind., manufacturer of mechanical power transmission machinery, and merged into a $10,000,000 company to be known as the Dodge-Foote Corp., subject to approval of stockholders. The two boards of directors have approved the consolidation plan.

Consolidation would be through the exchange of stock and the assumption of liabilities of both companies, requiring no public financing. Plans include a funding arrangement for the Foote Bros. obligation to banks totaling about $800,000, it is stated.

Dodge Mfg. Corp. has plants in Mishawaka and Oneida, N. Y. The activities of the plants supplement rather than duplicate each other, according to a letter to stockholders. Plans are to transfer Foote Bros. manufacturing to the Mishawaka plant of the Dodge company. G. C. Miller, now president of Dodge corporation, would be president of the new corporation, and J. F. Griswold, president of Foote Bros. Gear & Machine Co., would be a member of the board of the consolidated company.

Canada Continues to Add To Its Tariff Wall

Ottawa, Ont.—Higher tariff rates on imports of steel products, coal, automobiles, leather and miscellaneous food products were proposed by Premier Bennett in his eagerly awaited "budget speech" delivered here to parliament June 1. A duty of 40 cents a ton is imposed upon American anthracite and the duty on bituminous fuel is raised to 75 cents from its former level of 50 cents a ton. This coal move is an effort to induce Canadian burning of Nova Scotian and British Columbian coal.

Until the steel tariff rates are published, which may be a matter of several days, details will not be obtainable. Used autos are banned among imports, while the duty is increased 2½ per cent to a total of 30 per cent on autos costing $1200 to $2100, and to 40 per cent on those costing more than $2100.

Foreign Trade Independent Of Tariff, Says Farrell

JAMES A. FARRELL, president of the United States Steel Corp. and of the National Foreign Trade council, addressing the eighteenth National Foreign Trade convention at New York, May 27, expressed doubt that tariffs hold as much importance in international business as has been held recently.

That countries with all degrees of tariff and with none are suffering equally in the present depression and that slumps in business have followed enactment of low and of high tariffs in this country was adduced to support his view. He said:

"There is much confusion of thought regarding our tariff schedule as a factor in our present trade recession. Seeing that the unfavorable conditions apply indiscriminately to all countries, low tariff, high tariff and free trade alike, it must be obvious that tariff discussions between opposing schools of thought are of academic interest only, in a period that calls for early adjustment of our difficulties.

Blames Other Factors

"To those who complain that American trade has suffered through the present tariff law I need only point to the fact that similar complaints were made concerning the effects of the lower tariff schedule of 1913. In neither case has the existing law availed to prevent a business slump. In 1914, under a low tariff, we entered upon a period of trade stagnation which was only relieved by the abnormal demands of war. In 1930, with a higher tariff, trade fell off.

"On which side shall we elect to stand? Obviously we must look to other causes as the major factors which have tended to disturb the balance between production and consumption throughout the world."

Mr. Farrell also aligned himself with those who believe the increasing use of machinery is a blessing rather than a detriment, both to the health and happiness of the worker and to the best interests of business in general and export business. In referring to this problem he said:

"We have heard much lately of the malign influence of the machine upon our modern civilization. How easy it is, by the mere reiteration of a phrase sometimes, to excite the prejudice of the unthinking and uninformed. . . .

"Admit of No Return"

"The benefits of mechanical aid in every department of life so completely encompass us as to admit of no return to an age when these mechanical inventions were unknown. We can no more rid ourselves of this mechanical aid to a more spacious life without injury to our civilization than we can hope to cure a disease by killing the patient.

"The most economical use of machinery is always found where those who operate it enjoy a fair standard of living and comfort. It is not without significance in this connection that it is in those manufactured products which yield highest wages that we find in increasing proportion the mainstay of our foreign trade."

Addressing the Export Managers club of New York, May 28, in connection with the foreign trade convention, Dr. Julius Klein, assistant secretary of commerce, defended the tariff and denied that it hampers American trade or penalizes Europe. In sup-

Col. Carmi A. Thompson, Cleveland, chairman of the International-Stacey Corp., Columbus, O., and prominently identified with the Lake Superior iron ore industry, broadcasting at the recent dedication of the Ohio state office building, Columbus

port of his contention he said the shrinkage in exports in the present depression is within a fraction of one per cent of the decline in the depression of 1921, close to 18 per cent. in each case. He called attention to figures of his department showing that in some instances shrinkage in imports were greater in the case of duty-free articles than in those on which a duty is paid.

Demand for an extra session of congress to legislate blanket cuts of 25 to 50 per cent in the tariff was made by the president of the National Council of American Importers and Traders.

Financing Provisions Necessary

Eugene P. Thomas, vice president of the United States Steel Corp., addressing the foreign trade convention, May 29, called attention to need of proper provision for financing foreign trade and explained what has been done by European nations and the United States and what should be done further to make the most of export opportunities. After outlining the growth of new conditions following formation of the Federal Reserve bank in 1914 which enlarged export opportunities he said:

"Witnessing such a revolutionary change in our industrial outlook within the brief space of seventeen years, we may well ask ourselves whether our compasses need readjustment facing so complex a future. The war and its aftermath have brought many changes. None is more significant than those disturbing influences of post-war readjustment which in many countries have led to the temporary abandonment of well-established economic doctrines.

"The contrast of these experiments to our own industrial system, which is a natural growth of tried principles; the extension on a wider scale of governmental direction, in a sphere where experience excites distrust of undue governmental interference; these invite serious examination as to their bearing upon American overseas business.

"In a greater degree than yet experienced, the American exporter is confronted with world competition more highly collective in character—competition now largely organized and financed through governmental channels. Are the present agencies of American export trade adequate to the task of overcoming these fresh obstacles?"

Feiker Heads Bureau of Foreign, Domestic Commerce

Washington—Frederick M. Feiker, since 1926 executive secretary of the Associated Business Papers Inc., New York, May 29 was appointed director of the bureau of foreign and domestic commerce, department of commerce, by President Hoover.

Mr. Feiker, who is 50, since 1906 has been actively engaged in business journalism. In 1921 he obtained leave of absence from the McGraw-Hill Co., New York, of which he was vice president, to assist Mr. Hoover, then secretary of commerce. In this capacity he helped reorganize the department of commerce, leaving in 1926 to go with the Associated Business Papers Inc.

Mr. Feiker succeeds William L. Cooper, who resumes his former position as commercial attache at London.

Receiver To Continue To Operate Empire Steel

Cleveland—Following his appointment May 28 as receiver for the Empire Steel Corp., Mansfield, O., Carl H. Henkel, who has been president, said, "at an early date all facts relating to the corporation will be placed before Federal Judge Samuel West at Cleveland and authority sought to continue operations in order to complete materials in progress, to meet the needs and requirements of customers and to retain customer connections and good will and the value of a going concern."

Appointment of a receiver followed judgments obtained May 23 by Youngstown and Niles, O., banks, totaling $398,578. The receivership was decided upon at a conference of banking and other creditors of the company. The formal application was filed by Interlake Iron Corp., largest merchandise creditor, for $460,000. A total of $220,000 also is owing Youngstown Sheet & Tube Co.

Current liabilities of the corporation are approximately $2,000,000. Outstanding in bonds is $3,200,000. Bank loans aggregate $1,140,000. The corporation, organized by the Davey interests in December, 1927, was put under new management in November, 1930, when the Interlake Iron Corp. purchased the Davey common stock, amounting to 14 per cent of the total. Paul Llewellyn, formerly with the Interstate Iron & Steel Co. of Chicago, was made chairman and Mr. Henkel, president.

The corporation has an annual ingot capacity of 330,000 tons, and an annual capacity of 486,000 tons of black sheets.

A THOUSAND TONS OF WELDED STEEL FRAMEWORK

This new General Electric Co. plant at Cleveland, being erected by the Austin Co., Cleveland, is 323 feet wide by 412 feet long. It is said to be one of the largest welded industrial plants

The Business Week In Washington

INTERSTATE commerce commission will not institute any general investigation into freight and passenger rates of its own volition at this time, it has been officially announced. This is the answer to the informal proposal of eastern railroads.

□ □ □

A study is now being made by a special committee appointed by the secretary of labor on the displacement of men in industry by machines. The initial meeting of the committee was held in Washington last week.

□ □ □

Annual appropriation from congress for the United States shipping board has decreased from $50,400,000 to $2,400,000 in the last seven years according to Chairman T. V. O'Connor. This is because the government is nearly out of the shipping business, he stated.

□ □ □

During 1929, according to the bureau of the census, more than $70,000,000,000 worth of goods was manufactured, of which more than half represented the output of six states: New York, Pennsylvania, Illinois, Ohio, Michigan and New Jersey.

Goes to 5-Day Week

Allis-Chalmers Mfg. Co., Milwaukee, is operating on a 5-day week basis. This schedule is expected to continue for a while. Operations have been planned to give employment to as large a number as possible, and the company has not reduced the pay of shop employes.

May Iron Rate Turns Down As 8 More Stacks Go Out

REFLECTING a loss of three active blast furnaces in April and eight more in the succeeding month, production of coke pig iron in May broke the upward trend of four consecutive months and turned down. The daily rate shrank 2631 gross tons, or 3.9 per cent.

Average daily production in May was 64,355 tons, against 66,986 tons in the month before. The rate for May one year ago was 104,564 tons. On the last day of the month only 105 of the country's 307 blast furnaces were making iron. On April 30, active units numbered 113. Two merchant furnaces were blown in during the month and 4 were blown out or banked, the net loss for this class being 2 units. Of the steelworks class, 3 were blown in and 9 blown out, with a net loss of 6 for this group.

Total production aggregated 1,995,002 gross tons, which compared with April output of 2,009,582 tons, was a drop of 14,580 tons and this in spite of the fact that May was a one-day longer month. Of the May total, 392,630 tons constituted merchant iron and 1,602,372 tons was steelworks or nonmerchant iron.

For the first five months of the current year, production has totaled only 9,460,125 tons, while during the corresponding period of 1930, the figure was 15,370,106 tons. The decrease was 38.5 per cent.

Relating production to capacity, operations in May represented 44.7 per cent. Operations in April were 46.5 per cent and in March, 45.4 per cent.

Furnaces blown in during the month were: In Ohio: Haselton No. 5, Republic Steel Corp. In Pennsylvania: Edgar Thomson F, Carnegie Steel Co. In New York: One Port Henry, Witherbee Sherman Co. In Colorado: One Minnequa, Colorado Fuel & Iron Co. In Michigan: One Detroit, M. A. Hanna Co.

Stacks blown out were: In Ohio: Central D, American Steel & Wire Co.; Jisco, Jackson Iron & Steel Co. In Pennsylvania: National No. 1, National Tube Co.; Cambria D, Bethlehem Steel Co.; Edgar Thomson J and K and Clairton No. 1, Carnegie Steel Co.; one Monessen, Pittsburgh Steel Co. In New York: Standish, Chateaugay Ore & Iron Co. In Virginia: Oriskany, Lavino Furnace Co. In Illinois: Gary Nos. 9 and 11, Illinois Steel Co.; one Federal, By-Product Coke Corp.

AVERAGE DAILY PRODUCTION

	1931	1930	1929	1928
Jan.	55,337	91,573	110,742	92,113
Feb.	61,114	101,640	114,942	99,954
Mar.	65,448	104,930	119,662	103,199
Apr.	66,986	106,371	122,106	106,066
May	64,355	104,564	125,753	106,219
June	.....	97,817	123,887	102,745
July	.....	85,110	122,016	99,120
Aug.	.....	81,455	120,845	101,193
Sept.	.....	75,893	116,548	102,120
Oct.	.....	69,851	115,747	108,824
Nov.	.....	62,182	106,081	110,155
Dec.	.....	53,732	91,513	108,702
Ave.	62,649	86,141	115,808	103,365

MONTHLY PRODUCTION

	1931	1930	1929
Jan.	1,715,443	2,838,751	3,433,028
Feb.	1,711,192	2,845,937	3,218,376
Mar.	2,028,906	3,252,822	3,709,518
April	2,009,582	3,191,119	3,663,167
May	1,995,002	3,241,477	3,898,344
June	.....	2,934,508	3,715,104
July	.....	2,638,441	3,782,511
Aug.	.....	2,525,105	3,746,198
Sept.	.....	2,276,781	3,496,454
Oct.	.....	2,165,374	3,588,146
Nov.	.....	1,865,458	3,182,420
Dec.	.....	1,665,715	2,836,917
Total	9,460,125	31,441,488	42,270,183

MAY PIG IRON PRODUCTION

	No. in blast last day of month		Total tonnage made	
	May	April	Merchant	nonmerchant
Ohio	24	25	51,116	395,110
Pennsylvania..	32	37	65,877	529,395
Alabama	13	13	111,352	80,046
Illinois	10	11	68,310	137,347
New York	5	5	43,607	47,608
Colorado	2	1		
Indiana	7	9		
Maryland	3	3	4,915	279,487
Virginia	0	1		
Wisconsin	0	0		
Kentucky	1	1		
Massachusetts	1	1		
Tennessee	0	0	13,797	79,968
Utah	1	1		
West Virginia..	2	2		
Michigan	4	3		
Minnesota	0	0	28,607	34,501
Missouri	0	0		
New Jersey ..	0	0		
Spiegel and ferro, all states			5,049	18,910
Total	105	113	392,630	1,602,372

RATE OF OPERATION
(Relation of Production to Capacity)

	1931[1]	1930[2]	1929[3]	1928[4]
January	38.4	65.0	79.0	66.8
February	42.5	72.1	82.2	72.5
March	45.4	74.5	85.5	74.8
April	46.5	75.4	87.4	76.8
May	44.7	74.2	89.8	77.0
June	.....	69.3	88.5	74.4
July	.....	60.3	87.2	71.8
August	.....	57.8	86.4	73.3
September	.....	53.8	83.3	74.1
October	.....	49.6	82.6	78.9
November	.....	44.1	75.8	79.8
December	.....	38.1	65.5	78.8

[1]Based on capacity of 52,515,875 tons Dec. 31, 1930; [2]on capacity of 51,490,680 tons; [3]on capacity of 51,069,895 tons; [4]on capacity of 50,329,750 tons. Capacities by American Iron and Steel institute.

Michigan Iron Ore Mine Valuations Raised

Valuation of iron ore holdings in Michigan for taxation in 1931 has been fixed tentatively by the state tax commission and mine appraiser at $90,894,000, an increase of $986,000 over 1930. More than one-fourth of this net addition, namely, $250,000, is represented by an increase in the valuation of the Ford Motor Co.'s Blueberry mine on the Marquette range.

This underground mine was developed in 1929 and 1930, and the ore now is valued at $1,100,000 for taxation purposes. It is the eighth largest on the range, from the standpoint of valuation. The Cleveland-Cliffs Iron Co.'s Negaunee mine has the highest valuation, $4,650,000.

Valuation of Cleveland-Cliff's Morris mine was increased from $750,000 to $1,075,000, and its Lloyd and East Lloyd mine raised from $1,000,000 to $1,290,000, because of larger developed reserves.

Reserves of iron ore on which the total valuation is based are estimated by the state at 170,987,345 tons, an increase of 2,637,522 tons over 1930. This increase is due largely to small shipments in 1930 and the resulting increase in stockpile ore. Ore that is not disclosed by development and low-grade ore not usable at present are not assessed.

Merger Appeal Indefinite

Youngstown, O.—While the circuit court of appeals has suggested that it will hear some time this month the merger appeal case involving the Youngstown Sheet & Tube Co. and the Bethlehem Steel Corp., attorneys for both companies say they have not yet been apprised of the exact date at which the court proposes to hear the appeal. It will be recalled that this is the merger attempt by these steel companies which was successfully contested by Cyrus S. Eaton and his associates, decided by Common Pleas Judge David G. Jenkins here last December. At that time Judge Jenkins made permanent the temporary injunction against the merger.

Acquires Welding License

New York—Babcock & Wilcox Co. has acquired from the Automatic Arc Welding Co., also of New York, a license to perform welding under the latter's automatic arc welding patents. The license is nonexclusive.

April Steel Exports Shrink As Imports Grow Heavier

EXPORT trade in iron and steel products during April, totaling 101,081 gross tons, decreased by 8431 gross tons from the year's peak of 109,512 tons in March, according to the iron and steel division, department of commerce. It was, however, considerably greater than either the February or January total, larger than that of February by 9869 tons and that of January by 8336 tons. The daily average movement of these products was 3369 tons, compared to the March daily movement of 3533 tons and that for February of 3258 tons.

Import trade continued the gain started in March to reach a new high for the year with a total of 47,872 tons received, compared to March receipts of 40,401 tons, and to those of February of 28,045 tons.

There were no marked changes in any of the 46 commodities making up the export trade. With the lone exception of South America all of the 5 major geographical divisions of the world took a smaller tonnage of our exports compared to March shipments.

April shipments to Canada totaled 53,281 tons and included 13,106 tons of scrap, 8179 tons of plain shapes, 7995 tons of black steel sheets, 4566 tons of boiler and other plates and 3601 tons of skelp.

IMPORTS AND EXPORTS
Gross Tons

	1931 Imports	1931 Exports	1930 Imports	1930 Exports
Jan.	40,781	92,745	43,624	223,766
Feb.	28,045	91,212	43,326	197,225
March	40,401	109,512	56,618	238,329
April	47,872	101,081	53,686	208,604
4 mo.	157,099	394,550	197,254	868,039
May	.....	.....	54,315	195,425
June	.....	.....	48,953	159,273
July	.....	.....	39,083	131,580
Aug.	.....	.....	35,405	150,922
Sept.	.....	.....	40,285	131,045
Oct.	.....	.....	38,344	131,845
Nov.	.....	.....	43,098	111,979
Dec.	.....	.....	40,754	101,992
Total	.....	.....	537,491	1,981,985

ORIGIN OF APRIL IMPORTS
Gross Tons

	Steel Ingots, Blooms	Steel Scrap	Cast Iron Pipe	Steel Bars
Austria	.....	.....	.....	16
Belgium	1,500	.....	670	2,205
British West Indies	.....	.....	.....	.....
Canada	1	1,169	.....	.....
Cuba	.....	96	.....	.....
Czecho-Slovakia	.....	.....	.....	8
France	135	.....	490	612
Germany	143	.....	.....	437
Netherlands	.....	.....	.....	827
Sweden	8	68	.....	340
United Kingdom	117	.....	.....	109
Total	1,904	1,333	1,160	4,554

IMPORTS OF IRON AND STEEL PRODUCTS
Gross Tons

Item	April 1931	March 1931	April 1930
Pig iron	14,479	7,357	12,183
Sponge iron	1	.....	
Ferromanganese, Spiegeleisen (1)	2,253	3,022	6,168
Ferrochrome (2)	35	21	.....
Ferrosilicon (3)	77	65	846
Scrap	1,333	1,348	1,770
Ingots, blooms	1,904	2,299	1,347
Concrete bars	4,934	3,944	
Hollow bar, drill steel	142	187	4,168
Merch. steel bars	4,554	5,133	
Iron slabs	21	.....	
Iron bars	88	73	213
Wire rods	655	455	1,019
Boiler, other plate	61	480	1
Sheets, skelp	1,541	2,362	3,962
Tin plate	11	12	18
Structural shapes	6,538	6,938	15,122
Sheet piling	366	.....	
Rails, fastenings	2,544	113	428
Cast pipe, fittings	1,160	588	645
Welded pipe	403	1,076	383
Other pipe	805	866	1,043
Barbed wire	499	502	443
Round iron	265	195	487
Flat wire, strip	62	65	114
Wire rope, strand	209	247	311
Other wire	63	96	19
Hoops and bands	1,921	1,841	2,394
Nails, tacks	508	676	322
Bolts, nuts, rivets	46	167	58
Horse and mule shoes	.....	2	.....
Castings, forgings	192	137	222
Total	47,872	40,401	53,686

(1) Manganese content.
(2) Chromium content.
(3) Silicon content.

DESTINATION OF APRIL IRON AND STEEL EXPORTS
Gross Tons

	Galvanized steel sheets	Tin terne plate	Black sheets	Steel bars
Argentina	22	539	897	30
Brazil	515	710	31	6
Canada	407	278	7,995	2,015
Central Amer.	221	5	6	113
Chile	11	65	77	38
China	155	516	321	272
Columbia	208	52	22	90
Cuba	227	230	9	50
Dutch E. Ind.	66	.....	.....	.....
Finland	48	.....	.....	.....
France	.....	.....	380	3
Greece	16	99	.....	.....
Italy	.....	242	137	.....
Japan	81	2,260	457	27
Java	30	.....	1	.....
Mexico	632	1,240	41	12
Norway	67	.....	1	.....
Panama	80	.....	1	84
Philippines	1,269	808	4	88
Peru	109	553	97	94
Soviet Russia	.....	.....	.....	.....
Turkey	.....	.....	.....	.....
United King.	4	.....	181	903
Uruguay	66	81	73	1
Venezuela	221	3	.....	12
Total	4,435	8,798	10,904	3,897

ORIGIN OF APRIL IMPORTS
Gross Tons

	Iron Ore	Pig Iron	Manganese	Ferro-manganese
Algeria-Tunis	15,101	.....	.....	.....
Australia	9,915	.....	.....	.....
Belgium	.....	.....	.....	.....
Brazil	.....	.....	14,071	.....
Brit. India	.....	11,499	2,860	.....
Canada	.....	.....	.....	1,140
Chile	86,612	.....	.....	.....
Cuba	11,500	.....	.....	.....
France	.....	.....	.....	21
Gold Coast	.....	.....	983	.....
Italy	.....	.....	.....	182
Java	.....	.....	415	.....
Mexico	108	.....	.....	.....
Netherlands	.....	2,688	.....	.....
Spain	8,740	.....	.....	.....
Sweden	7,329	.....	.....	.....
Soviet Russia	23,347	.....	14,590	.....
United Kingdom	.....	292	.....	910
Total	162,652	14,479	32,919	2,253

EXPORTS OF IRON AND STEEL PRODUCTS
Gross Tons

Item	April 1931	March 1931	April 1930
Pig iron	286	324	1,327
Ferromanganese, spiegeleisen	1	.....	1,348
Iron and steel scrap (including tin plate scrap)	15,622	16,946	48,494
Ingots, blooms	218	462	2,216
Bars, iron	87	84	77
Bars, steel	3,897	5,823	11,424
Bars, alloy steel	291	453	740
Wire rods	3,239	3,594	4,299
Boiler plate not fabr.	5,112	6,243	12,150
Skelp	3,603	7,318	5,399
Iron sheets, galv.	333	1,002	372
Steel sheets, galv.	4,435	4,805	7,477
Steel sheets, black,	10,904	7,973	12,127
Iron sheets, black	1,032	431	858
Hoops, bands, strip	3,148	3,778	3,824
Tin, terne plate	8,798	8,522	22,525
Shapes, not fabr.	9,066	11,440	12,665
Structural shapes, plates, fabr.	3,800	3,573	4,558
Metal lath	343	247	664
Rails	4,117	3,724	13,704
Rail fastenings	689	1,099	1,957
Boiler tubes	998	763	2,362
Casing and pipe, seamless and welded	2,297	1,592	6,944
Malleable screwed pipe fittings	487	489	889
Cast-iron screwed pipe fittings	261	208	456
Cast-iron pressure pipe and fittings	2,319	825	1,194
Cast-iron soil pipe and fittings	590	1,115	386
Welded black, galv. steel pipe	4,020	3,467	7,085
Welded black, galv. wrought pipe	375	561	1,090
Plain black or galv. wire	1,482	1,101	3,341
Barbed wire, woven-wire fencing	2,639	2,163	4,763
Woven-wire screen cloth	84	433	102
Wire rope	279	272	468
Insulated wire, cable	33	25	44
Other wire	434	401	650
Wire nails	810	670	666
Tacks	50	29	60
Bolts, nuts, rivets	576	519	908
Iron castings	464	489	644
Steel castings	189	450	2,123
Car wheels, axles	716	906	1,183
Forgings, steel	717	885	761
Total	101,081	109,512	208,604

Industrial Men in the Day's News

Walter H. Hallstein, President, Purchasing Agents Association of Chicago Inc.

HE has devoted much study to the lifting of purchasing to the high plane it occupies today, closely allied with selling in the circulatory system of any business.

AFTER a 2-year engineering connection with the city of Chicago, he started as salesman for the company of which he now is treasurer and director, in charge of purchases.

LONG active in matters pertaining to the purchasing agents organization in Chicago, he served on its board of governors and is now its president.

RELATION of the purchasing department to the welfare of industrial enterprise and its responsibilities, particularly at such times as the present period of business recovery, have long been interesting subjects of study to Walter H. Hallstein. He recently was elected president of the Purchasing Agents Association of Chicago. Mr. Hallstein, at 41, is treasurer and director of Ilg Electric Ventilating Co., Chicago, manufacturer of about $2,500,000 worth of industrial ventilating and air conditioning equipment annually. He also directs its purchases. His advancement is typical of the recent industrial trend to regard purchasing as a major department of the business organization, and one worthy of increased representation in official councils.

A native of Chicago, Mr. Hallstein was graduated from Lane Technical high school, and in 1914 received his B. S. degree in civil engineering from Armour Institute of Technology, that city. He worked for about two years in the municipal engineering department of Chicago, leaving in 1916 to become salesman for the Ilg company, then about seven years old. The ensuing period was one marked by rapid expansion. In 1917 a centralized purchasing department was proposed and Mr. Hallstein, because of his interest in developing centralized purchasing, his natural aptitude for organization, supplemented by his training and experience in engineering and sales work, was placed in charge. He was made treasurer of the company about two and a half years ago and given a place on the board of directors, in addition to retaining his purchasing duties and responsibilities.

Mr. Hallstein has been actively interested in the movement to develop purchasing departments of industrial companies on a plane of greater character, and has been energetic in the affairs of the Purchasing Agents Association of Chicago. He has served as a member of the board of governors of that organization.

F. H. N. GERWIG, assistant superintendent of blast furnaces at Edgar Thomson works, Carnegie Steel Co., Pittsburgh, since November, 1913, has been appointed superintendent of blast furnaces, to succeed the late A. C. Maccoun. Mr. Gerwig was born in Pittsburgh, attended the public schools of Wilkinsburg, Pa., and was graduated in 1895 from the University of Western Pennsylvania, now the University of Pittsburgh, with the degree of mechanical engineer. He commenced his industrial career as a draftsman with Julian Kennedy, Pittsburgh, Engineer, in July, 1895. In January, 1898 he went to the Duquesne works of Carnegie Steel Co., remaining until Nov. 30, 1900. His next connection was with S. V. Huber & Co., Pittsburgh, as assistant chief engineer but he returned to the Carnegie company in May 1901, as steam engineer at Duquesne works. He was made assistant master mechanic of Duquesne works in 1903 and two years later became assistant superintendent of Carrie furnaces. In 1912 Mr. Gerwig went with Pittsburgh Steel Co. as superintendent of blast furnaces and returned to Carnegie Steel Co. the following year as assistant superintendent of blast furnaces at Edgar Thomson works, remaining in that capacity until the present appointment.

□ □ □

J. S. Tritle, vice president in charge of manufacturing operations, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., since May 1, 1929, May 27 was elected vice president and general manager in charge of manufacturing, sales and engineering, with headquarters at East Pittsburgh. He will report direct to F. A. Merrick, president. A biographical sketch of Mr. Tritle appeared in IRON TRADE REVIEW of June 6, 1929.

□ □ □

F. E. Ross has been elected president and general manager of American Furnace & Foundry Co., and of American Boiler & Foundry Co., Monroe, Mich., to succeed E. C. Watson, resigned in May. Mr. Ross was a leader in the promotion of the two companies, the furnace company being organized in 1920 and the boiler company in 1924.

Charles W. Steidle was named sec-

retary-treasurer for the two companies, which have the same directorate. Mr. Steidle succeeds Mr. Ross in those positions.

□ □ □

T. W. Jenkins has been appointed superintendent of the Monroe, Mich., plant of Newton Steel Co., Newton Falls, O.

□ □ □

Philip Keller retired May 1 as treasurer of H. C. Frick Coke Co., Pittsburgh, after a 50-year continuous connection.

□ □ □

Thomas Pritchard, superintendent of the Girard, O., plant of the A. M. Byers Co., for the past 30 years, was transferred June 1 to the company's wrought iron plant at Ambridge, Pa.

□ □ □

Herman Mitchell, formerly in the foundry of Auto Specialties Mfg. Co., St. Joseph, Mich., has been appointed superintendent of its Windsor, Ont., plant.

□ □ □

Walter C. Shunk has been appointed mining engineer for Goodman Mfg. Co., Chicago, electric mining machinery, to succeed the late Sidney W. Farnham.

□ □ □

C. Wilson Jr., vice president and general manager, is now also in charge of the sales department of the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. H. W. Bishop Jr., has resigned as general sales manager.

□ □ □

Frank J. Herkal has been appointed general superintendent of Progressive Metal Products Inc., Minneapolis. He formerly was owner of the Flour City Brass & Aluminum Co., Minneapolis, and later was salesman for General Metals Refining Co., St. Louis.

□ □ □

George B. Garrett, sales engineer, Arthur G. McKee & Co., Cleveland, will sail for England June 6 where he will remain for some months to represent his company. The McKee company recently formed an association with the Whessoe Foundry & Engineering Co. Ltd., Darlington, England.

□ □ □

C. H. Harmon, formerly identified with Black Hawk Mfg. Co., and Litchfield Mfg, Co., both of Waterloo, Iowa, and previously with Canedy-Otto Mfg. Co., Chicago Heights, Ill., now is identified with Superior Brass Foundry, Waterloo, having purchased an half interest.

□ □ □

George B. Karelitz, who was research engineer for Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., before he resigned in September, 1930, to assume duties on the engineering faculty of Columbia university, has returned to the Westinghouse organization as acting manager of the mechanics division of the Westinghouse Research Laboratories. He succeeds John M. Lessells, transferred to South Philadelphia, Pa., works. Mr. Karelitz became affiliated with the company in 1923.

□ □ □

Samuel Mather, H. G. Dalton, Elton Hoyt II, H. P. MacIntosh Sr., Harris Creech, Frank Purnell and Fayette Brown were re-elected directors of Interlake Steamship Co., Cleveland, at the recent annual meeting of stockholders.

□ □ □

W. H. Crawford, president of Reliance Mfg. Co., Massillon, O., now the Reliance division of Eaton Axle & Spring Co., Cleveland, has been placed in charge of Reliance plants in Massillon and Detroit.

E. D. Cowlin continues in charge

F. H. N. Gerwig

of sales of the Reliance division, with offices at Massillon.

□ □ □

Franks Baackes Jr., formerly in the Cincinnati office of American Steel & Wire Co., Cleveland, has established headquarters at 1 North La Salle street, Chicago, where he has charge of the sale of products of Keystone Steel & Wire Co., Peoria, Ill., to certain of the industrial and jobbing trade.

□ □ □

Emil Traner was re-elected president and treasurer of Rockford Drilling Machine Co., Rockford, Ill., at the recent annual meeting. Other officers are: E. C. Shields, Detroit, vice president, and G. A. Shallberg, Moline, Ill., secretary. These officers and C. F. Davis, president of Borg-Warner Corp., Chicago, and Erik Ekstrom, president of Mechanics Universal Joint Co., Rockford, also a Borg-Warner unit, comprise the directorate.

□ □ □

Joseph A. Carlin, formerly receiver for Hutto Engineering Co., Detroit, has been appointed general manager. Other appointments follow: Frank J. Jeschke, sales engineer; Ben O. Isom, representative for Detroit and Chicago territories; William F. Toepfer, representative in New York, Philadelphia and Boston districts; J. L. Navin, field engineer for Cleveland, Pittsburgh and western New York, and James G. Young, European representative.

□ □ □

Thomas Temple, formerly superintendent at Dekalb, Ill., for American Steel & Wire Co., Cleveland, who for more than 15 years has been superintendent at Birmingham, Ala., on July 1 becomes superintendent of the company's two planats at Joliet, Ill. Following his service at Dekalb, Mr. Temple was transferred to Anderson, Ind., where he served about three years and then was transferred to Birmingham.

□ □ □

Adolph Rider Jr., in the employ of Lukens Steel Co., Coatesville, Pa., since 1902, has been placed in charge of offices recently established by that company at New Orleans, which will be operated as Lukens & Co. Inc., to handle direct mill sales. Prior to 1902 Mr. Rider was associated with Carnegie Steel Co., Midvale Steel & Ordnance Co., and Cambria Steel Co. In 1902 he represented the Lukens company at Tampa, Fla., and later was transferred to Atlanta, Ga.

□ □ □

Tom J. Muir, assistant sales manager for the last three years of Morgan Engineering Co., Alliance, O., has been appointed director of sales. He has been connected with the company for 29 years in various capacities, 24 of which were spent in the sales department.

A. T. Davis has been made sales manager. He has been identified with the company for 19 years, the last 12 of which he has been in the sales department.

□ □ □

Harold P. Mueller, formerly vice president and director of sales, L. J. Mueller Furnace Co., Milwaukee, has been elected president and general manager to succeed his father, the late L. J. Mueller Jr., who was president, and treasurer.

Paul E. Mueller has been elected to the newly-created office of chairman of the board. Gustave C. Mueller continues as vice president, and Joseph Schlueter was elected secretary-treasurer.

□ □ □

Harrison Hoblitzelle, vice president and general manager of the Commonwealth division, Granite City, Ill., formerly Commonwealth Steel Co., has been elected executive vice president in charge of operations of the Granite City and Eddystone, Pa., plants. His headquarters will be in Philadelphia. Mr. Hoblitzelle became identified with the Commonwealth or-

ganization in November, 1917, in the purchasing department. He later was made vice president in charge of sales, and then vice president and general manager.

John H. Lock, affiliated with Commonwealth division and its predecessor, Commonwealth Steel Co., since 1912, has been promoted from assistant general manager to general manager of that division, to succeed Mr. Hoblitzelle.

□ □ □

Albion Bindley, associated with Pittsburgh Steel Co., Pittsburgh, for a number of years will succeed Robert McMillan, purchasing agent for the past 20 years, who retires July 1.

□ □ □

Archibald Hazlehurst has been appointed manager of sales of the Sterling Steel Foundry Co., Braddock, Pa. He formerly was associated with American Steel Foundries in Chicago and Pittsburgh.

□ □ □

Harry L. Brindle, assistant general superintendent of Farrell works, Carnegie Steel Co., Pittsburgh, has been made general superintendent to succeed A. L. Cromlish, recently transferred to Duquesne works. Mr. Brindle was born in Sharon, Pa., and joined the Carnegie Steel organization in 1917 as an apprentice roll turner.

□ □ □

Frank D. Chase, president of Frank D. Chase Inc., Chicago, architect and engineer, has been installed as president of the Western Society of Engineers. Vice presidents are D. J. Brumley, chief engineer, Chicago terminal improvements, Illinois Central railroad; Harry B. Gear, assistant to the vice president, Commonwealth Edison Co., Chicago, and Charles C. Whittier, engineer, Robert W. Hunt Co., Chicago. Leigh S. Keith has been re-elected treasurer.

Obituaries

JOHN T. ARNOLD, 71, who for more than a quarter century before he retired a year ago was production head of the stoker division at Attica, N. Y., of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., died May 31 at Attica. He had been in the Westinghouse employ since 1888.

□ □ □

Fred Emmons, 65, president of Union Chain & Mfg. Co., Sandusky, O., died there recently.

□ □ □

Phillip S. Rinaldo, 54, president. Flexible Steel Lacing Co., Chicago, died May 30, at Wheaton, Ill. He was one of the founders of the company.

□ □ □

Arthur S. Martin, 46, head of the Firthite and engineering departments, Firth-Sterling Steel Co., McKeesport, Pa., died recently at Pittsburgh.

□ □ □

George T. Rowland, 55, president of William & Harvey Rowland Co., Frankford, Pa., maker of automobile springs, died May 16 at Detroit.

□ □ □

Edward D. Adams, 85, prominent engineer credited with originating the system of hydroelectric power development at Niagara Falls, N. Y., died at New York, May 20.

□ □ □

W. W. Williams, 58, head of W. W. Williams Co., Columbus, O., distributor of contractors' and industrial equipment, died May 27. He entered the industrial field in 1905 as secretary of Williams Contractors' Supply Co., but established his own company in 1912.

□ □ □

Barzillai G. Worth, 51, vice president and chief engineer in charge of power plant design, Walter Kidde & Co., New York, died May 25. He was a graduate of Stevens Institute of Technology, and a member of the American Society of Mechanical Engineers.

□ □ □

Albert N. Abbe, 71, vice president in charge of purchases and director of American Hardware Corp., New Britain, Conn., died May 29. In 1887 he became purchasing agent for the P. & F. Corbin Co., and when it merged into American Hardware Corp. in 1903, he was retained in that capacity. He later was elected vice president.

American Sheet & Tin Plate Is Closing Four Plants

Cleveland—Four important plants of the American Sheet & Tin Plate Co., located in three states of the Middle West, have been closed down for an indefinite period. Since all mill supplies are being shipped from these four mills to others of the company, it has raised the question whether these plants will be reopened this year.

The works included in the shutdown order are: Tin mill black specialty works at Chester, W. Va., galvanized roofing specialty plant at Dover, O., planished black sheet works at Scottdale, Pa., and the roofing terne works at Morgantown, W. Va.

Sheet Sales Down in April; Shipments Increased

Sheet sales in April as reported by the National Association of Flat Rolled Steel Manufacturers, Cleveland, amounted to 6400 net tons on a daily basis, compared with 7623 tons in March, a reduction of 16 per cent. Production averaged 7120 tons daily, 1.5 per cent down from 7236 tons in March. Shipments increased 4.7 per cent, from 6716 tons to 7037 tons.

Sales for April as reported to the association totaled 191,987 tons; production, 213,608 tons; and shipments, 211,118 tons. Unfilled tonnage as of May 1 amounted to 325,169 tons, compared with 383,280 tons April 1. Total sheet capacity in the United States for April was approximately 543,400 tons. The capacity on which the association's figures are based is 367,350 tons.

Steel Casting Production Down from March Level

April's bookings of commercial steel castings failed to improve over March and in addition a six-point decline was shown in total production. Following monthly figures are reported from the department of commerce:

1930	Total bookings tons	Per cent of capacity	Total production tons	Per cent of capacity
April	92,987	64.4	110,692	76.7
4 mos.	431,368	74.7	440,792	76.4
May	91,077	63.1	104,984	72.8
June	61,164	42.4	90,795	62.9
July	57,850	40.1	78,977	54.7
Aug.	50,370	34.9	64,303	44.6
Sept.	49,542	34.3	61,919	42.9
Oct.	45,552	31.6	59,522	41.2
Nov.	48,123	33.3	44,290	30.7
Dec.	49,387	34.2	46,290	32.1
Year	884,433	51.1	991,872	57.3
1931				
Jan.	46,810	32.1	46,294	31.8
Feb.	40,292	27.7	49,520	34.0
March*	48,159	33.1	56,730	39.0
April**	45,671	31.4	48,298	33.2
4 mos.	180,932	31.1	200,842	34.5

*Revised. **Preliminary.

April Structural Orders Best Since December, 1929

Bookings of fabricated structural steel rose to 73 per cent of capacity in April when 293,000 tons were booked, the largest total since December, 1929. Shipments were slightly under the March figure. Following comparisons are by the department of commerce estimate based on actual report of 211 fabricators:

	Bookings		Shipments	
1930	Tonnage	Per cent capacity	Tonnage	Per cent capacity
April	222,800	55.7	284,000	71.0
4 mo.	966,000	67.5	274,800	68.7
May	279,200	69.8	265,200	66.3
June	253,600	63.4	280,000	70.0
July	270,000	67.5	274,800	68.7
Aug.	252,000	63.0	262,400	65.6
Sept.	155,600	38.9	243,200	60.8
Oct.	209,200	52.3	239,200	59.8
Nov.	151,200	37.8	195,200	48.8
Dec.	152,800	38.2	168,400	42.1
Year	2,689,600	56.0	2,987,200	62.2
1931				
Jan.	162,400	40.6	172,000	43.0
Feb.*	158,400	39.6	166,400	41.6
Mar.*	184,400	46.1	147,200	37.8
April	293,600	73.4	147,600	36.9
4 mos.	798,800	49.9	637,200	39.8

*Revised.

MIRRORS of MOTORDOM

DETROIT

AFTER pegging along at 4500 units daily, 5½ days a week, since late in April, Chevrolet last week stepped up its daily production rate to 5000 units. This expansion slightly more than offset the loss due to the Memorial day holiday and brought Chevrolet output for May up to 113,852 units, compared with 106,096 in April and 113,187 last May.

This increase by Chevrolet plus slight gains by Reo and DeVaux-Hall neutralized moderate recessions by Packard, Auburn-Cord, Hupp, Marmon, Durant and Cadillac-La Salle. The result was that automobile production in the week ended May 30 approximated 75,000 units, on a parity with the preceding week but slightly lower than in the first two weeks of May.

This steadiness in passenger car assembly plus continued slight gains in truck output made no visible inroad on pessimistic sentiment, which seems to have thickened at Detroit. While it is conceded that May made a good showing by approximating April's activity, the outlook for June is that a rather general recession is in prospect.

Retail Sales Declining

For this appraisal of June two factors are largely responsible: A distinct decline in retail purchases of automobiles beginning at the middle of May and unchecked at the end, and a disposition by practically all manufacturers to curtail their commitments for materials for June delivery.

Chevrolet, for example, has opened June with a tentative schedule of 72,000 passenger cars and 10,000 trucks for the month, or a decline of about 30,000 units from May. The experience of Chevrolet, however, has been that it increases rather than diminishes its schedule.

Not only is Ford taking in less material in June but he also has advised some of his parts and material suppliers that June 28 or July 1 will mark the end of his requirements, for the time being. This substantiates the widely-held belief that Ford is approaching a mid-summer shutdown. Meanwhile, Ford assembly continues unchanged at about 7100 units daily, 3 days a week.

Tire Covers for Fords

Ford now is installing metal tire covers on deluxe models. They are made in two models; one with a smooth narrow bright band over the tread of the tire with two painted walls; the other is similar with the exception of two raised beads on the bright metal surface. The parts maker on this work was hesitant in adopting corrosion-resistant steel for this bright part, both due to expense and the effect on his present fabricating equipment. Accordingly, the smooth banded tire covers are chromium plate, the only bright metal on the Ford that is not corrosion resistant steel; while only the cover with the two beads is made of the corrosion resistant material.

All Chrysler lines continue steady, with Plymouth producing 250 cars, 5 days; Chrysler, 400 cars, 5 days; DeSoto 225 cars, 5 days; and Dodge 500 cars, 5½ days.

Plymouth's forthcoming model, still a 4-cylinder, is designed to be as nearly vibrationless as a floating suspension will permit. In particular, a barrier to the transmission of vibration from the motor to the steering wheel has been set up. Some mechanical features from last year's De Soto will be incorporated in the new Plymouth. Chrysler is assembling some of the "70 model," utilizing the new type of Chrysler radiator.

Buick holds unchanged at 525 cars, 4 days. Its May total was 9256, against 13,939 in April, due to the retreat from a 5-day week to a 4-day week. For June a further loss is now indicated.

Cadillac-LaSalle production for all models averages about 110 units daily, 4 days. A moderately large surplus of Cadillac V-16 is reported in some of the larger cities. It is understood that several important dealerships of this producer are undergoing a change in management.

Reo is averaging 90 to 100 units daily, 5 days a week, this increase being accounted for largely by the introduction of the new light six and eight. Reo's May production of 1737 was a gain of 714 over April, with further improvement in June likely. De Vaux-Hall, with Reo and Chevrolet the only maker to show an increase last week, is now assembling between 900 and 1000 units weekly.

Automobile manufacturers showing practically no variation in production include Graham at 1000 units weekly, Hudson-Essex at 2000, Nash at 1000, Oakland-Pontiac at 3300, Oldsmobile at 1350, Studebaker at 1650, Willys-Overland at 3000.

Oldsmobile's May production was 6025 units, a loss from the 7574 of April. Graham in May turned out 4005 units, against 2554 in April.

Auburn Sets Record

Auburn-Cord in May broke all records with a total of 6717 units. A decline to 5000 is expected in June. On May 25 shipments of Auburn models passed the total for all 1929, this maker's greatest year.

Thus, for the first seven manufacturers to report their May production, the net gain over April was 5403 units. Ford for the United States only—the same basis on which other manufacturers report—probably will report a slight loss, hence a May total approximating April still is probable.

Franklin, which has been assembling about 150 cars weekly, is closed

the first half of June, as annually.

The tubular front axle for automobiles crops up again. Logan Gear Co., Toledo, O., is making this part for the Willys Overland Co., but aside from past use on the Chrysler 70, 72 and 75 series, its application has been limited. Many automobile producers have considered its value in lighter weight, easier driving, turning and riding qualities, but have had to shelve the idea for cost considerations. Ford at one time was experimenting with the idea of putting this form of axle on Model A.

A. O. Smith, Milwaukee, is expected to bring out a new product or part soon of an unstated nature, but relating to the automotive world. The company has been known to be searching for an automotive article to produce to supplement its pipe and automobile frame business, but which has the restriction of not being produced mechanically heretofore. It is the intention of the company to install equipment for its automatic production.

(Mirrors of Motordom will appear again next week.)

Newton Capitalizes Water Advantage at Monroe

Detroit—Concentration of its sheet-rolling facilities at its Monroe, Mich., works has been begun by the Newton Steel Co. For this purpose its Newton Falls, O., works have been shut down this week. Whether the Newton company will remodel its Newton Falls plant into a tin plate mill, as has been rumored recently, depends upon what financial arrangements it may make at some time in the indefinite future, so its officials say.

Dredging of the mouth of the Raisin river, on which the Monroe works are situated, will have been completed by the federal government within a fortnight. Thereafter the company expects to receive regularly its supply of sheet bars from Chicago or Cleveland by water delivery during the lake navigation season. Provision has been made for winter storage of a sheet bar supply at Monroe.

From the company's docks at Monroe it is expected that delivery of the company's sheet mill products will be made by water to Cleveland, Chicago or elsewhere as desired, in some cases as return cargoes. Whether a system of cargo lake steamers or of tug-towed barges will be employed still is to be determined by the Newton company. It has been employing auto trucks to advantage in its Detroit deliveries.

McKeesport Tin Plate Co., Pittsburgh, declared the usual extra dividend of 50 cents and the regular quarterly dividend of $1, both payable July 1 to record June 10.

Here and There in Industry

EUGENE F. PHILLIPS ELECTRICAL WORKS LTD., Brockville, Ont., has awarded a contract for a copper rod rolling mill to be built jointly by the Farrel-Birmingham Co., Ansonia, Conn., and the Dominion Engineering Works Ltd., Montreal, Que. It is to be of the Belgian type with automatic and semiautomatic handling devices. It is designed to produce 15 tons of ¼-inch round rod per hour in fourteen passes, from standard wire bar, with finishing speed of 1650 feet per minute. It also will roll numerous other shapes.

□ □ □

Boiler Engineering Co. has moved to larger quarters in the National Newark & Essex Bank building, 744 Broad street, Newark, N. J.

□ □ □

L. G. S. Devices Corp., Indianapolis, is adding equipment to double its output of free-wheeling devices. The company is a division of the Cord Corp.

□ □ □

Costello Engineering Co., 519 Oliver building, Pittsburgh, has been awarded a contract by the Continental Steel Corp., Kokomo, Ind., for a continuous kiln annealing furnace.

□ □ □

Divine Bros. Co., Utica, N. Y., has recently taken over the complete sale of casters manufactured by the Transue & Williams Steel Forging Corp., Alliance O.

□ □ □

Wappat Inc., division of the Simonds Saw & Steel Co., Fitchburg, Mass., has opened a branch office at 259 Delaware avenue, Buffalo, with J. W. Mumma as regional sales manager.

□ □ □

Follansbee Bros. Co., Pittsburgh, has moved its Milwaukee office to room 700, First Wisconsin National Bank building. H. H. Wherry, representative in that territory for 24 years, remains in charge.

□ □ □

V. E. Montgomery Co., 806 First National Bank building, Cincinnati, has been appointed by the Gulf States Steel Co., Birmingham, Ala., as exclusive agent for pig iron in Ohio, Indiana and Michigan.

□ □ □

Truscon Steel Co. of Canada Ltd. has opened offices at 620 Vancouver block, Vancouver, B. C., under management of E. G. Ryley, who succeeds D. G. Brison, resigned, company representative in British Columbia for eight years.

□ □ □

Canadian General Electric Co., Toronto, Ont., has increased facilities and will add production of radio receiving sets in affiliation with General Electric Co., Schenectady, N. Y. All parts will be of Canadian make.

□ □ □

Cutler-Hammer Inc., Milwaukee, has moved its sales office at Atlanta, Ga., to 133 Cone street. The new quarters include warehouse facilities and a stock of motor control, wiring device and safety switch items will be carried. A. C. Gibson is district manager.

□ □ □

Ferro Enamel Corp., Cleveland, manufacturer of porcelain enamels for coating metals, has greatly extended its research laboratory facilities. Devices have been added for measuring capacity of the enamel. H. D. Nee has been transferred from the engineering department to the research laboratory.

□ □ □

Canton Steel Ceiling Co., Canton, O., has been bought by a group including W. H. Davey, president of the Canton Tin Plate Corp., Canton, John W. Yohe, of New York, and others. The business will be continued without change under the new management. A previous statement attributing the purchase to the Canton Sheet & Tin Plate Co. is in error.

□ □ □

S. G. Taylor Chain Co., Hammond, Ind., will start in June its fifty-ninth year of production of welded chain and fittings. This is one of the few concerns under active direction of the family of its founder. S. G. Taylor Jr., son of the founder, S. G. Taylor, has been active head for more than 35 years and his son, E. Winthrop Taylor, is vice president. The company makes electric welded, fire welded and hand welded chain.

□ □ □

Dominion Bridge Co., Montreal, Que., has expanded its output and that of its subsidiaries by addition of new lines, as a result of protection afforded by the new emergency tariff. Canadian Pipe & Lining Co. has been formed as a subsidiary, to make concrete-lined steel pipe. The company is to start manufacture of reduction gearing and the Dominion Hoist & Shovel Co., a subsidiary, has begun the manufacture of a gasoline shovel just perfected.

EDITORIAL

Survey of Low-Grade Iron Ore Deposits Important

THIRTY years ago, before the formation of the United States Steel Corp., there was an iron ore industry in the Lake Superior district. Though generally referred to today as an "industry," the business of mining no longer exists as a separate and distinct unit. It is a subsidiary operation in the production of iron and steel, controlled principally by companies whose chief interests are in the steel market.

Mines, ships, docks, railroads, blast furnaces, steel plants and mills have become so linked by purchases and mergers that for all practical purposes they are one single, integrated industry. With the organization of the Steel corporation, and the inevitable purchase and leasing of iron ore deposits by steel producers, a movement greatly accelerated in recent years, the identity of the original mining companies has been fused with the names of the leaders in steel. More than 95 per cent of the ore now is mined by the same interests who convert all, or nearly all of it, in their own blast furnaces.

If the Lake Superior iron ore industry had continued under separate, independent control, one may well imagine the feeling of uneasiness that would prevail in the steel industry concerning reports that the good grades of ore will be exhausted in about 25 years, and that nothing is certain about the poorer grades. Perhaps there would be a suspicion that such estimates were made too conservative for business reasons, and steel manufacturers would want to know definitely how much ore they could depend on obtaining in the future.

Fear of Excessive Taxation Tends To Discourage Estimates of Resources

As the industry now is constituted, however, the question of reserves has appeared to be a private matter. Steel companies have considered it dangerous to reveal publicly anything more than necessary concerning their iron ore holdings, because of their fear of excessive taxation.

Though the states have attempted to arrive at fair estimates for the best grades of ore, and have exempted large deposits of inferior material, past experiences and political uncertainties have taught the steel companies to be wary.

Considerably more specific information on the extent of low-grade ore deposits would be available if it were not for this conflict regarding taxes. It is true that a mine owner under ordinary circumstances is reluctant to disclose the probable amount of ore he possesses, and were it not for the methods adopted by the states in taxing ore still less might be known about total resources. The state of Minnesota owns a number of mines which it leases, and is in position to form a sound judgment as to their tonnages; just as it is concerning other developed open pit mines, where the ore lies near the surface.

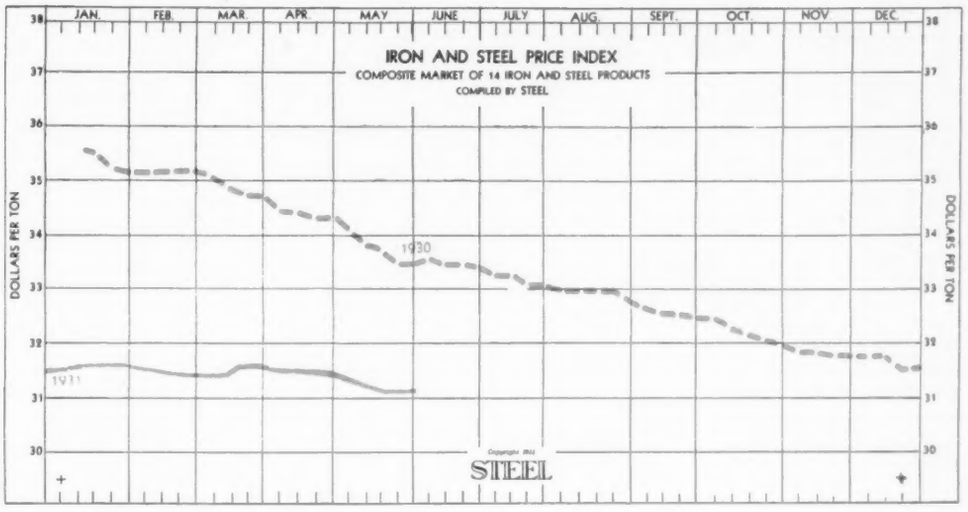
The steel companies are not broadcasting their ideas as to how much ore is available to them, but in co-operation with the mining departments and technical universities of the states they are steadily seeking to increase their knowledge of low-grade ores, and are improving present practices for beneficiating ore. Though more than one-third of all the material shipped to blast furnaces first passes through some process of beneficiation this is accomplished without any interference to mining operations, and capacity is more than sufficient to supply the demand.

Steel Companies on Alert for New Methods of Concentrating Lean Iron Ore

Methods by which some of the low-grade ore will be treated in the future are at present unknown—another reason why steel companies hesitate to put an estimate on their holdings. Thirty per cent ore, through some process similar to flotation, may become usable before some of the grades which contain as much as 40 per cent iron. A large amount of material is in the form of rock, and the first efforts to concentrate the hard magnetic iron ore of the eastern Mesabi have failed to attain commercial success. The merchantable ore taxed amounts to 1,500,000,000 tons while estimates of the low-grade ore and iron-bearing formation run up to several billion tons.

The state of Minnesota has been trying to obtain a reliable estimate of the low-grade deposits, and at the state university's mines experiment station $7000 a year is reported appropriated for two years for further study. Such a sum is entirely inadequate for a thorough, independent investigation; the co-operation of the owners of the mines is necessary. These owners would be disposed to work with the states for a broad survey of this kind, and accurate conclusions of great economic importance to the country, if the movement did not become merely one for imposition of more taxes.

THE BUSINESS TREND



Monthly Averages

May	$31.37
April	31.59
March	31.66
Feb.	31.65

Weekly Figures

May 27	$31.33
May 20	31.37
May 13	31.37
May 6	31.40
April 29	31.49
April 22	31.51

May Statistics Will Reflect Extent of Relapse

THE first important monthly statistics for May, which will be available in a few days, will afford a better index of the extent of the present recession than did the April figures, which in some cases reflected the momentum of first-quarter activities.

For instance, the daily pig iron average was higher in April than in March, although it was known long before the month ended that production was being curtailed. The banking of stacks, which was first noted in April, has continued throughout May and it is to be expected that the daily average for the fifth month will be down.

Steelworks operations, which were at the rate of 49 per cent of capacity at the beginning of May, receded gradually to 41 per cent at the close of the month. This means that the output of steel ingots for May will be several per cent under the total for April.

Lower Car Loadings in May Are at Variance With Seasonal Trend

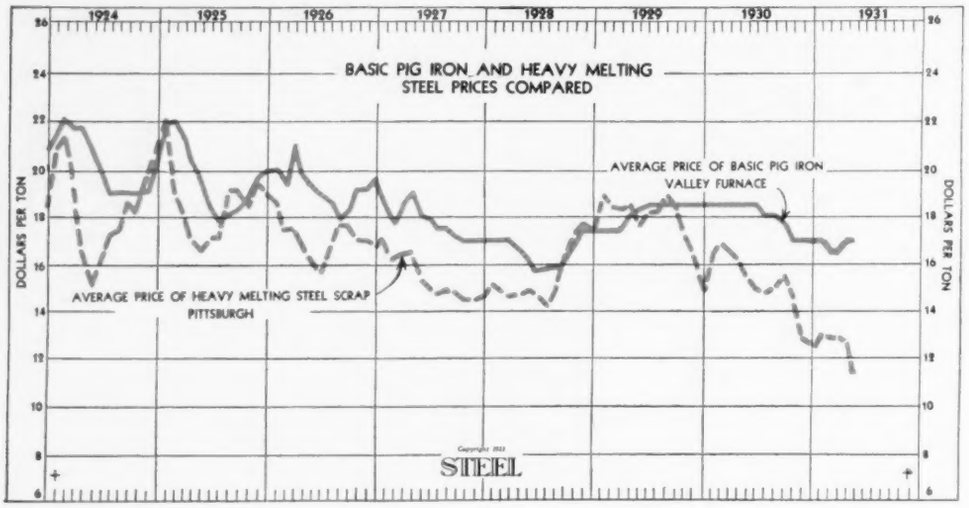
The record of freight car loadings in May will be worth watching, because it may indicate how far business has veered from its seasonal course. Last year loadings in May were greater than in April and April was better than March. This year loadings in April exceeded those of March, but by a slender margin. Freight volume in the first week of May was most encouraging, the total of 775,291 cars being by far the largest thus far this year. However, loadings in the second week slumped to 747,449 and in the week ending May 16 the total was 747,732, a slight gain. Unless marked improvement is registered in the final weeks, the total for May will be below the seasonal curve. As it is, loadings still are trailing 18 per cent below 1930 figures.

While on the subject of freight car loadings, it is well to call attention again to the fact that this index is not reliable over long periods of time. A comparison of loadings of today with those of five years ago would be misleading because a greater proportion of freight is carried by motor trucks and inland waterways today than was the case in 1926. Statistics on this diverted freight traffic would be extremely valuable.

Signs of Summer Recession in Motor Car Output Are More Prevalent

April automobile output showed the expected encouraging gain, but the weekly figures for May show a moderate easing off of schedules during the past few weeks. This recession was foreseen by steelmakers in the reduced demand for steel apparent at least a month ago.

No change has occurred in the commodity price situation. The weekly barometers continue to lose from one-half to one point a week. It is now more than two months since prices broke from the futile attempt at stabilization in March. STEEL's composite of prices of 14 iron and steel products is down to $31.33, the lowest registered in 16 years.



Basic Pig Iron

	1931	1930
May	$17.00	$18.50
April	17.00	18.50
March	16.75	18.50
Feb.	16.75	18.50

Heavy Melting Steel

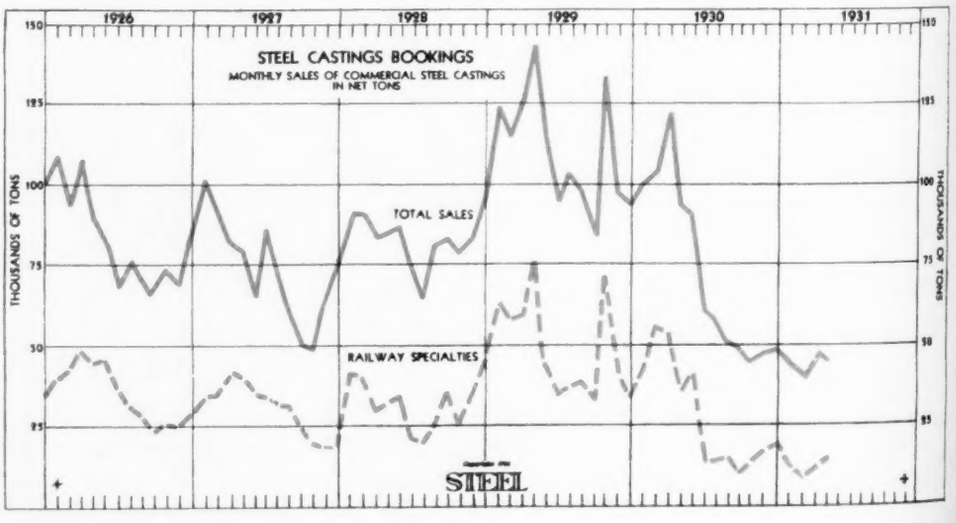
	1931	1930
May	$11.25	$15.40
April	12.50	16.05
March	12.90	16.60
Feb.	12.75	16.90

Heavy Melting Steel's Monthly Average Dips Below 1921 Figure

Heavy melting steel scrap, Pittsburgh, subjected to price declines at the beginning and end of the month, reached a new low monthly average in May, at $11.25. Basic pig iron held steady at $17, to which quotation it had reacted in April. The scrap price is the lowest May figure on record, and it dipped below the previous monthly low of $11.30 in September, 1921. December, 1914, was the last month with a lower quotation, $10.45, the alltime record being $10.40, established in November, 1914. Other scrap items shared the drop, adjustments in the less active grades taking place as a realignment at the lower levels. The basic pig iron price remained in a quiet market.

Bookings of Railway Specialties Rise; Miscellaneous Castings Lose Further Ground

In the record of orders and production of steel castings for April, the single exception to declines was in bookings of railway specialties. Total bookings dropped to the second best position of the year at 45,671 tons. Orders for miscellaneous castings descended to another new low, amounting only to 29,667 tons, or 37.9 per cent of capacity. Orders for railway specialties rose from 11,012 tons to 16,004 tons, or 23.8 per cent, the best position of the year. Production of railway specialties, however, dropped from 14,211 tons to 12,759 tons, or 19 per cent of capacity. Total output declined from 56,730 to 48,298 tons. Production to April 30 was 200,842 tons, and total orders were for 180,932 tons.

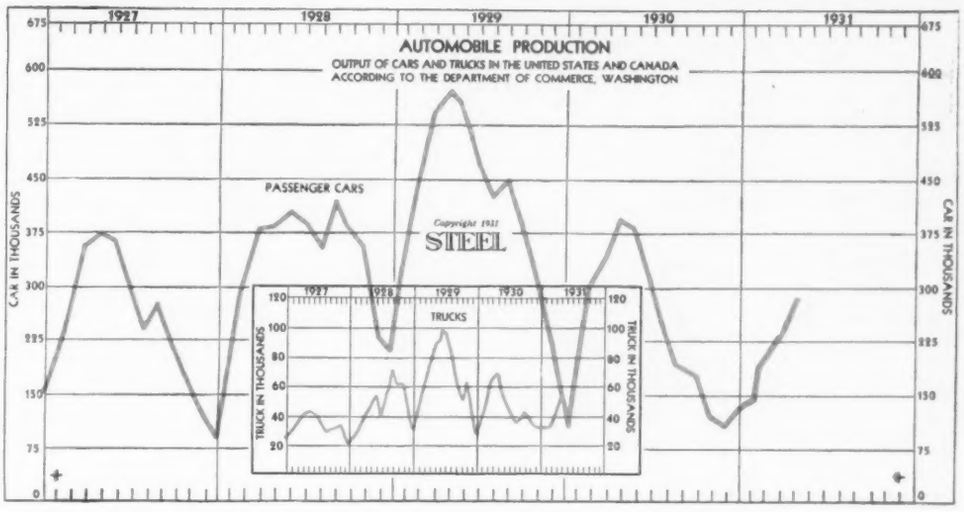


Total New Bookings

	Tons
April, 1931	45,671
March, 1931	48,159
April, 1930	92,987

Railway Specialties

	Tons
April, 1931	16,004
March, 1931	11,012
April, 1930	35,457



Passenger Cars

	1931	1930
April	299,736	393,804
March	241,727	350,559
Feb.	187,948	294,868
Jan.	142,869	254,049

Trucks

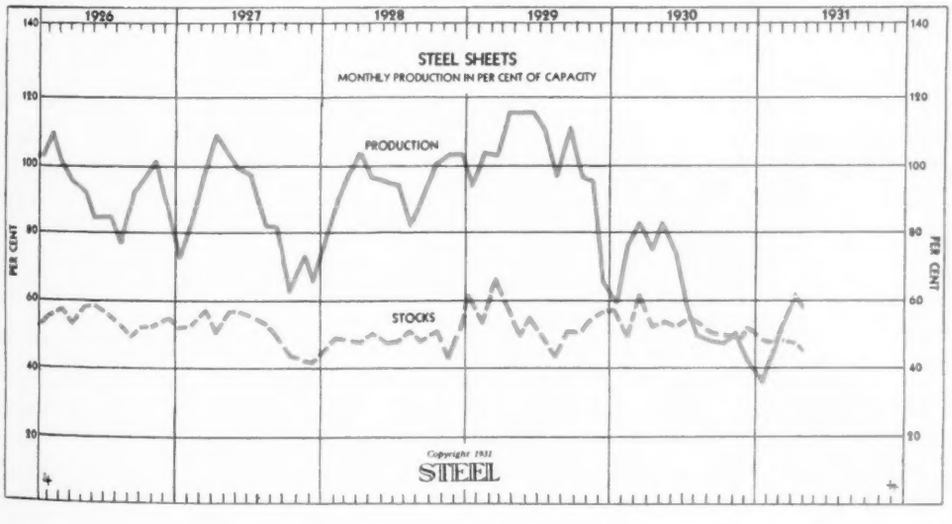
	1931	1930
April	53,131	74,477
March	47,671	66,559
Feb.	41,862	51,084
Jan.	35,478	38,560

Auto Production Makes Fifth Successive Gain During April

April's automobile output, totaling 352,867 units, constituted a gain of about 22 per cent over March and marked the fifth successive month of rising production. April of 1930, with a fourth successive gain and output of 468,281, was about 20 per cent higher than April of this year. Canada's production was 17,159 units compared with 12,993 in March, and consisted of 14,043 passenger cars and 3116 trucks. In the United States passenger cars gained from 231,244 to 285,693 and trucks from 45,161 to 50,015. The aggregate for the first four months of 1931 is 1,050,420 cars and trucks, compared with 1,514,970 in the same period of 1930 and 2,210,130 in the corresponding four months of 1929.

Stocks and Production of Steel Sheets Recede, Sales Drop Off Sharply

A slight gain in shipments and slackening production brought a decrease in stocks of steel sheets in April and the combination of declining sales and higher shipments more than cancelled lower production to bring unfilled orders down. Output of independent producers was 213,608 net tons, or 58.2 per cent of capacity, down from 61.1 per cent in March. Stocks dropped from 189,915 to 176,846 tons and shipments gained 2911 tons to reach 211,118 tons, the best monthly volume in 1931. Sales were off considerably, and went under production by declining from 64.3 per cent to 52.3 per cent of capacity. A year ago production was at the year's peak, with output of 308,988 tons, but was only 17,387 tons above shipments.

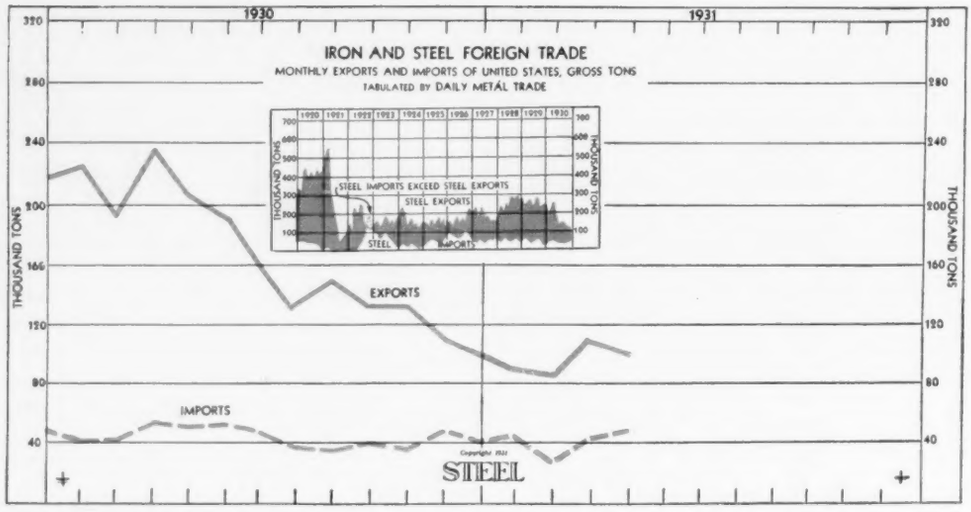


Production
Per cent of capacity

	1931	1930
April	58.2	84.0
March	61.1	73.7
February	57.2	83.9
January	45.1	77.6

Stocks
Per cent of capacity

	1931	1930
April	48.1	56.6
March	51.7	54.6
February	54.1	61.4
January	48.4	51.0



Exports

	Tons
April, 1931	101,081
March, 1931	109,512
April, 1930	208,640

Imports

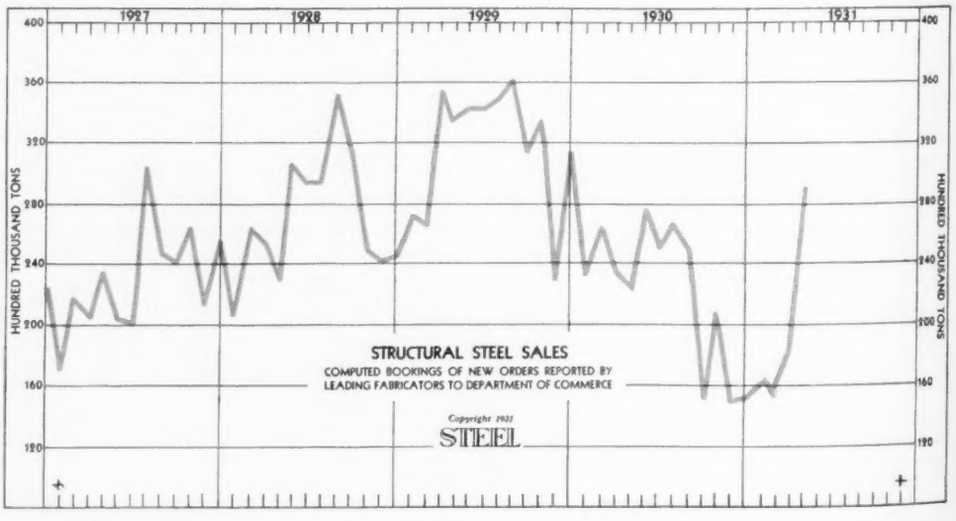
April, 1931	47,872
March, 1931	40,401
April, 1930	52,650

Imports Improve, but Exports of Iron and Steel Suffer Losses

Foreign trade in iron and steel products was marked in April by another decrease in exports, while imports rose for the second time. Exports were down 8431 tons to 101,081 gross tons, following a substantial gain in March. With the exception of February's total of 91,212 tons they were the lowest in several years. A year ago there was a decline from 238,329 to 208,640 tons. Imports gained 7471 tons and reached a total of 47,872 gross tons. The rise was smaller than that of 12,356 tons made in March. In April, 1930, shipments into the country declined from 56,618 to 52,650 tons. Scrap led again in exports, with shipments of 15,622 tons, followed by black sheets, structural shapes and tin plate. Canada took 53,281 tons of the total.

Sharp Gain in Structural Steel Bookings Brings Monthly Total to High Position

Structural steel fabricators booked a tonnage of 293,600 during April, the orders representing 73.4 per cent of the industry's capacity. Surging upward 59.2 per cent from the previous month, bookings were the best for any month since December, 1929. Except for a slight interruption last February, structural awards have progressed upward since last November. Shipments during April, on the other hand, eased to a new low at 147,600 tons, or 36.9 per cent of capacity. April was the second month in which shipments have been under bookings. Four-month figures for the present year show that orders were for 798,800 tons and shipments amounted to 637,200 tons, compared with 966,000 and 1,058,800 tons in the like period of 1930.



	Tons	
	1931	**1930**
April	293,600	222,800
March	184,400	236,800
February	158,400	267,600
January	162,400	238,800
	1930	**1929**
December	152,800	297,605

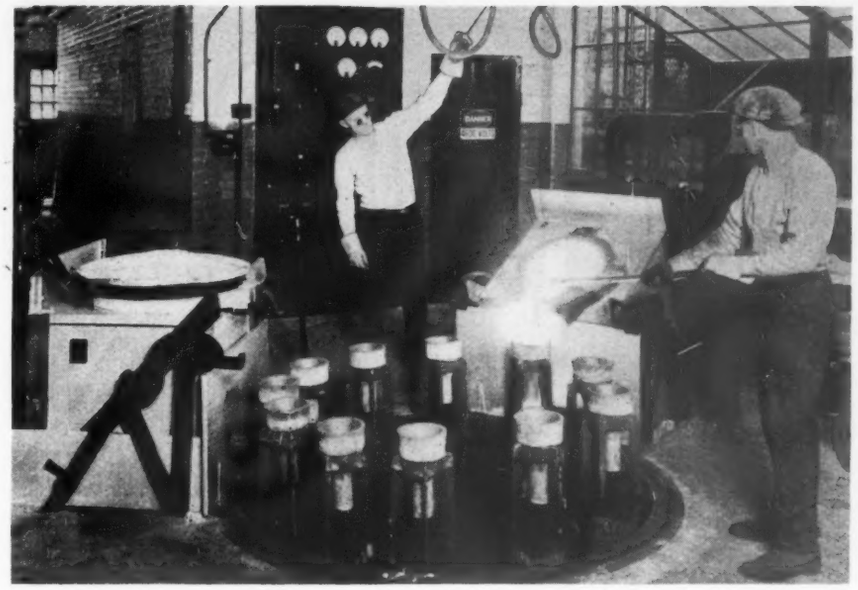


Fig. 1—High-frequency induction furnaces used for making chrome-nickel alloy steel

Coreless Induction Furnace Larger; Lining Improved

BY E. F. NORTHRUP
Ajax Electrothermic Corp.

TECHNICALLY considered, the holding capacity in pounds or tons of a coreless induction furnace, may be made as large as desired. Mechanically considered, a housing of asbestos lumber is sufficiently rugged for furnaces with a holding capacity of 2 tons or less; but with larger furnaces this type of housing could be made only with difficulty to meet mechanical requirements. In the last two years, a development has been realized whereby the charge and heating element (the inductor coil) can be housed in a box of magnetic steel. The framework supporting the housing may be constructed of ordinary structural steel. A so-called "external field eliminator" is used to prevent eddy currents and consists in lining the steel housing on its inner surface with high conductivity sheet copper about ¼-inch thick. Fig. 5 shows the construction of the inductor unit as it appears when it is viewed from the rear of the furnace.

The housing is substantially cubical instead of cylindrical, as sometimes constructed in European countries. The inductor consists of two coils of flattened copper tubing, one wound clockwise and the other counter-clockwise. The two halves of the inductor are joined in parallel. One terminal of the line to the condensers is at the center of the inductor where the two halves join and the other terminal goes to a loop which connects the two extreme ends of the inductor.

The number of turns wound to the foot in the inductor increases from the center of the inductor toward each end. In the central zone, the flattened copper tubing is wound flatwise. Near either end a few turns are wound with tubing of the same size not flattened and general turns at each end of the inductor are of tubing which has been flattened to the same extent as the tubing which is used for the central turns. These end turns, howevere, are wound edgewise. Thus a "graded" coil is obtained without vacant spaces between turns. The end sought in grading the induc-

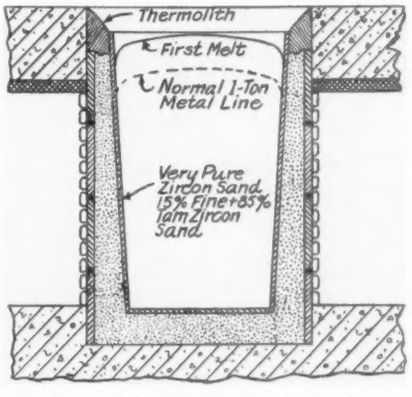


Fig. 2—Details of construction of 1-ton high-frequency furnace using refractory sand

tor is to give a magnetic field within the coil which is more nearly uniform and parallel to the axis of the inductor throughout its length. The field of force within a graded coil is straighter than in a uniformly wound inductor and tests show that "end losses" in the coil from eddy currents in the copper are less with a graded coil than with an ungraded coil. Moreover, solid cylinders of conducting material placed in a graded coil will heat more uniformly from center to ends than in one which is not graded.

The usual practice in the use of furnaces under 1-ton capacity is to drive the cooling water through the inductor coil under a pressure of 30 pounds or more. For operation of 1-ton furnaces and larger, the water may be drawn through the inductor by suction obtained with a small motor-driven water turbine. Should any molten metal escape and melt a hole in the inductor winding, the inductor quickly becomes emptied of water and no large amount of water will come into contact with molten metal. The refractory base on which the furnace coil and melting chamber rest is surrounded by an open space so disposed that in case metal should make an escape from the melting chamber, it will flow to the floor beneath the furnace with little opportunity of seriously damaging any part of the furnace structure.

Conductors Are Stationary

The usual practice for large furnaces is to bring the condenser leads and often the supply leads also to the blade side of heavy knife contact switches, the knife side of the switches being fastened to a box-like extension attached to the back of the furnace housing. Thus, when the furnace is tilted for pouring, no electrical conductors are moved.

No matter is of greater import and of more concern to the metallurgist and to the operator of a large furnace than the kind, life and method of using the refractory that forms the melting chamber. As a result of study and experiments, certain general principles have emerged which, if observed, will yield most satisfying results.

A. No fabricated prefired crucible for melting of ferrous metals is required; and when used, is found to be inferior to the more approved method to be described.

B. Powdered or sand refractories used absolutely dry are superior to refractories that have been dampened and tamped in, also to refractories containing a binder (as boric acid, molasses, sodium silicate, etc.) which have been tamped into place around a crucible or a former.

C. Refractories, which under repeated heatings to high temperatures, expand or contract due to changes in crystal structure generally give trouble and should be avoided. Thus, a magnesia crucible packed around with electrically sintered magnesia sand looks promising and, in fact, has been used for melting many tons of steel. The combination, however, is subject to a growth which may lift up the furnace top or bring damaging stresses on the inductor coil and other parts of the furnace structure. Furthermore magnesia is not a particularly good heat insulator.

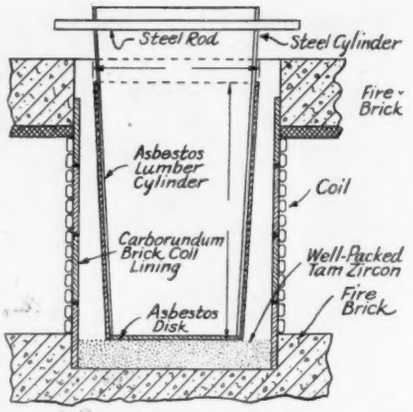


Fig. 3—Method of making melting chamber of multiple 1-ton high-frequency furnace

D. A granular refractory, as silica sand, may be tamped and densely packed if it previously has been mixed with some of the same material which has been ground into a fine flour. A pocket or melting chamber in dry material thus prepared and tamped is superior to any preformed and fired refractory for holding a highly fluid metal.

E. Small or large amounts of impurity in the refractory invariably lower the sintering and the fusion temperature and should be avoided.

F. The expansion coefficient of the refractory when sintered should be low to prevent small cracks in the sintered wall which develop with sudden heatings and coolings.

A pure silica sand with about 15 per cent by weight of the same material ground into a fine flour and mixed with it meets all requirements for an acid refractory except as to its softening temperature which is too low to make it useful for holding superheated steel and especially cast iron when superheated to 1600 or 1700 degrees Cent.

Experiments and commercial service have demonstrated that a pure zirconium silicate sand possesses all the useful properties of silica sand and in addition is more refractory. A grade known to the trade as "Tam" zircon (obtained as a natural sand from a Florida beach) to which 15 per cent of powdered zircon has been added is satisfactory for melting steel and for holding superheated cast iron.

How Material Is Used

A most effective and inexpensive method has been developed by the writer for using this material (but equally applicable to any dry, granular, pure refractory) without employing a preformed crucible around which to pack it. A slightly conical cylinder as shown in Figs. 2 and 3 is made of ¼-inch asbestos board. The bottom or smaller end is fitted with and closed by a ¼-inch asbestos board disk. The outside dimensions of this cylinder are chosen exactly the same as those of the melting chamber desired. The inside wall of the inductor coil has been lined permanently and previously with ¾-inch (in the case of a 1-ton furnace) carborundum brick well cemented together with refractory cement.

The chamber formed by the brick-lined inductor then is filled with refractory sand to a level with the desired bottom of the metal chamber. This sand, containing 15 per cent fines is packed down hard and level with an air or an electric rammer. The asbestos cylinder is packed symetrically in position resting on this bed of rammed refractory. On the inside of the asbestos cylinder is placed a close-fitting cylinder (open at the bottom) of ⅛-inch steel sheet. The top of this steel cylinder extends some inches above the top wall of the furnace. Its upper rim is supplied with two holes at opposite ends of a diameter through which a steel rod may be passed. This cylinder of steel is used to temporarily support the walls of the asbestos cylinder while the refractory is being tamped in hard. It afterward is lifted out by a crane hook attached to the cross-rod.

The refractory sand now is packed around the asbestos cylinder to a height a little above the level of a full charge of molten metal. The remaining distance to the level of the top of the furnace is filled with slightly dampened thermolith that soon hardens. Too much emphasis cannot be placed upon the extreme importance of ramming the refractory with a tamping tool hard around the asbestos cylinder. A little power is put

SENDING electomagnetic wave energy through refractories to impinge on a conducting mass which absorbs and converts it into useful heat is the fundamental principle of melting metals inductively. How the coreless induction furnace meets this condition is related in the accompanying article, prepared from a paper presented some time ago before a Pittsburgh meeting of the Association of Iron and Steel Electrical Engineers. The author, E. F. Northrup, is vice president and technical adviser, Ajax Electrothermic Corp., Trenton, N. J.

on the furnace to raise and to hold the steel cylinder at a dull red heat until all moisture absorbed by the lining from the air or elsewhere is expelled. When the steel cylinder cools, it may be withdrawn readily, and the furnace is ready for its first charge.

The first charge, chosen of rather small pieces of metal, is placed in the furnace and melted down. When the metal is melted, the asbestos cylinder will have melted completely and will float on top of the charge as slag which may be removed easily. No contamination of the first melt results from this procedure; and when the first charge is poured, a smooth-walled crucible is left in the furnace. Repeated melts may now be made.

The tamped-in refractory becomes sintered back from the metal a certain distance which varies with temperature, number of heats made, distance of metal from carborundum brick coil liner, etc. In the space remaining, the refractory is unaltered and, being in the form of a dry powder, it is an excellent retainer of heat in the furnace. When a new lining finally is installed the unsintered portion of the refractory is recoverable and may be used over again.

This method of lining a furnace is the best thus far that years of thought and experience has developed. It is highly successful and may be applied with advantage to both furnaces and pouring ladles of any size.

Has Low Expansion

The small co-efficient of expansion of sintered Tam zircon is a most striking and important property of this refractotry. An experiment was tried with a 30-pound furnace in which cast iron was melted and then superheated to 3700 degrees Fahr. poured out and a stream of water squirted into the white hot furnace until the refractory cooled down to room temperature. No cracks whatever developed in the refractory when this treatment was applied twice.

A typical installation for steel melting consists of a motor-generator set to supply the high-frequency power, control panels for the motor, the high-frequency generator and the furnaces; also condenser or capacitor units placed in oil-filled tanks, and a furnace or furnaces. Generally, two furnaces are supplied for alternate operation.

Differing from other electrical methods of melting metals, the furnace proper constitutes but a minor portion of the cost of an installation, generally less than 10 per cent. The reliability and life of a high-frequency melting equipment should be considered chiefly in respect to the electrical equipment employed, for the accidental complete destruction of a single furnace unit probably never would involve more than 10 per cent of the first cost of the installation. High-frequency generators (960 or 1000 cycles per second) are considered to be reliable and long-lived. In American practice, they operate at speeds of 1800 revolutions per minute for machines of moderate size and 1200 revolutions per minute for large units.

The larger sizes of high-frequency furnace units are made, for the most part, of steel, copper and refractory material. No part of the melting chamber ever becomes hotter than the metal melted, while the inductor coil and furnace housing are below the temperature of boiling water at all times. The refractory only, which holds the metal, is subject to wear and destruction; and this refractory is replaceable with speed and ease. In the later designs of larger size furnaces, any metal which may accidentally escape through the refractory will run to the floor and can cause only minor injuries to the inductor and furnace housing, and such may be repaired easily.

Cost Is Low

It may be concluded that as an offset to the rather high investment cost of a coreless induction furnace installation, the depreciation charge is low, and the hazard of a prolonged shutdown is slight.

Two or more high-frequency generators of the same voltage and frequency will operate well when running in parallel and feeding power to the same buses, Thus, an expansion of the electrical equipment is practicable at any time. Additional furnaces may be added likewise when required.

Capacitor banks should be placed close to the battery of furnaces because the current flowing in the capacitor buses is approximately eight times as large as the current in the power line. If the generators are driven by synchronous motors, a poor power factor in the plant may be improved or corrected at a slight extra cost by installing synchronous motors of higher kilovolt-ampere rating than would be required to drive the generators.

Melting Efficiency Defined

Strictly speaking, melting efficiency should be defined as the ratio of the actual tons melted with 10 per cent superheat to the theoretical figure for 100 per cent efficiency. As this latter is but roughly known, in considering here the melting efficiency, use will be made only of the kilowatt hours, metered at motor input, per 2000 pounds of metal melted as determined with operating installations that have given out records. From the general standpoint:—

A. Every known metal may be melted by high-frequency induction.

B. All the commercially-used ferrous metals, when melted in the same furnace, are melted with approximately the same kilowatt hours per ton.

C. The ohmic resistance of the metal charge has little effect on the kilowatt-hours required provided high and not normal-frequency currents are used.

D. The state of physical aggregation of the charge in the furnace affects the kilowatt hours required to some extent, but far less than would be supposed provided the frequency used is of the order of 1000 cycles per second or more. Thus, the metal may be in pigs, old gates, "cabbaged" scrap, loose or compressed turnings, sheet trimmings, small pellets or small irregular masses of any shape. The variation in the character of the charge on kilowatt-hours per ton required has less influence in a large furnace than in a small unit. In furnaces of a ton or more capacity, everything is "grist for the mill" because the furnace may be charged with whatever will go in it from loose turnings to large billets.

E. After the metal is melted, additional power is required to bring superheat; and when comparisons are being made between different furnaces, heats and kinds of charges, this fact must receive due consideration. Holding metal at a fixed temperature for refining purposes also requires power which like-

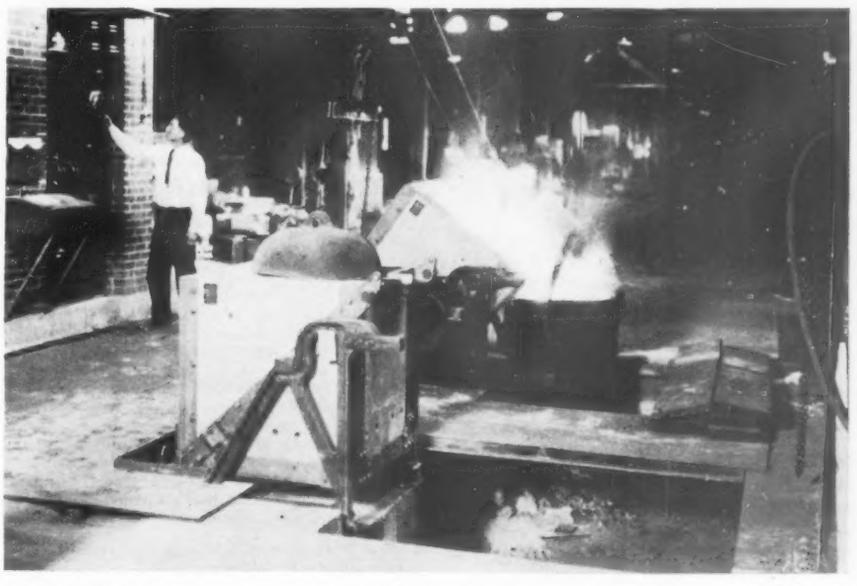


Fig. 4—High-frequency furnaces of 1000 pounds capacity. Pouring of a 1100-pound heat of corrosion-resisting steel is shown in background

wise must be taken into account.

F. The nature of the refractory used to pack the furnace affects the melting efficiency. A powdered or sand lining retains heat better than a sintered or molded lining. A siliceous lining in the form of a dry powder or sand is a better heat insulator than a basic refractory or electrically sintered magnesia when used in the same physical condition. A lining of Tam zircon, which is considered as neutral, is probably nearly as good a heat insulator as pure silica sand.

G. The overall efficiency of the motor-generator set which determines the percentage of the supplied power that is delivered to the furnace terminals has more influence on the kilowatt-hours per ton melted than has the efficiency of the furnace itself, because a certain percentage loss metered at the furnace terminals is a smaller quantity than the same percentage loss metered at the input side of the motor.

H. When the ratio of power supplied to the furnace to the pounds in the furnace charge, is maintained, large furnaces have a better melting efficiency than small furnaces. This naturally would be expected because the ratio of the cooling surface to the volume of the charge is less in a large than in a small furnace; and further, the wall thickness of the refractory through which heat may escape is greater in a large than in a small furnace.

I. A distinction must be understood clearly between what is termed the electrical efficiency of a furnace and its melting efficiency. The former is the ratio of the power absorbed by the charge and appearing as heat in the charge to the power delivered to the furnace terminals. If no heat which is delivered to the charge escapes, then the electrical and melting efficiency become the same, but no furnace can be made absolutely heat-tight. The melting efficiency therefore, will be less than the electrical efficiency of the furnace. Theoretically and practically, the electrical efficiency with correct designing will be independent of the size of the furnace; but the melting efficiency more nearly will approach the electrical in large furnaces than in small furnaces.

In a coreless induction furnace with the power off the surface of the molten metal when free from slag is perfectly flat. Any agitation observed under this condition comes from evolved gases due to chemical reactions within the metal.

If the metal starts quiescent and power gradually is built up on the furnace by increasing the voltage at its terminals, it will be observed that the surface of the metal takes on a convex contour which becomes more and more convex, the center of the metal surface rising higher and higher as the power input is increased. At full power, this center point of the convex dome will have risen to an easily measured height above the surface level of the metal when no power is on.

Chemical Composition Unchanged

It is probable that the use of coreless inductive heating for preparation of corrosion-resisting alloy steels is the most valuable at the present time. Corrosion-resisting steel scrap is accumulated at the rate of about 30 to 35 per cent of all such steel made. It has been demonstrated that this scrap in the

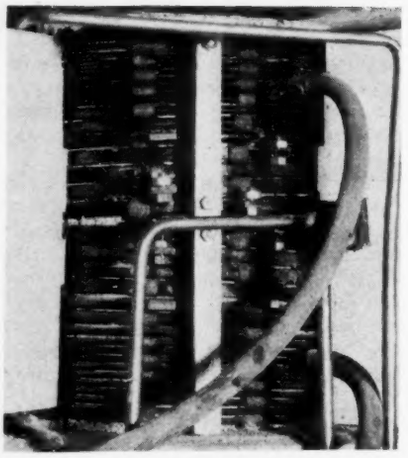


Fig. 5—Inductor consisting of two coils of flattened copper tubing viewed from rear of furnace

physical state in which it occurs can be remelted and poured into ingots which will have almost precisely the same chemical composition of the scrap fed to the furnace.

Furnaces of 3½-ton holding capacity, powered each with 1125 kilowatts are now under construction. With this type of furnace no opportunity exists for the metal to become oxidized or to gain or lose any chemical constituents, and the automatic stirring of the metal insures that the alloy will be homogeneous and clean.

Alloy Losses Small

Certain tests have shown that a furnace of 1000 pounds capacity, used without a cover, loses only 0.75 per cent of the 18 per cent chromium in the alloy. It is expected that a larger furnace, used with a cover, will lose practically no chromium.

The usefulness of a coreless induction furnace for refining must be decided by the metallurgist. If the structural features of a large furnace, earlier described, are employed, the coreless induction furnace may be considered as a large ladle which may be picked up by a crane, carried about and poured.

Practical and economic melting by coreless induction may be considered under the following classification:

A. Making high-melting semiferrous alloys to precise specifications as, nickel-chromium, stellite, etc.

B. Recovery of ferrous metal scrap without alteration of composition due to the melting process as corrosion-resisting steel, magnet steel, high permeability iron and alloy such as Permalloy, etc.

C. Melting ferrous metals to which alloy additions are made for pouring ingots of special composition as shear knife steel, high-speed steel, ordinary tool steel, etc.

D. Melting to put in ingot form certain high-melting metals as pure nickel, pure cobalt, pure iron from sponge iron, etc.

E. For melting ferrous alloys such as ferrosilicon, ferromanganese, ferrovanadium, ferrochromium, etc., to be used as liquid additions either to the charge in a large arc or open-hearth furnace or in the ladle.

F. Melting with a small furnace, tapped on a line feeding large furnaces, for making experimental steels and alloys previous to commercial melting.

G. For making silicon steel ingots of low-carbon content for rolling into sheets for transformers, etc.

H. For making any ferrous alloy which must be kept exceedingly low in carbon as deep drawing corrosion-resisting steel.

I. Foundry casting of alloy steel.

Employed as Superheater

By supplying the furnace ladle with high-frequency holding power only, the metal may be maintained hot and, if desired, superheated. Since, however, high-frequency holding power only will be generally insufficient to produce the active stirring of the metal which may be required, a method has been developed and used for regulating the degree of stirring to any desired extent without affecting the heating. This is accomplished by super-imposing on the high-frequency current, which flows through the inductor and which accounts for most of the heating, a certain controllable amount of 60-cycle current. This latter current heats relatively little but is equally effective for the same number of ampere turns in the coil with high-frequency current for stirring the metal.

Metals sometimes merely are superheated to secure certain metallurgical result. Thus, 1-ton furnaces are in use for superheating molten cast iron poured from the cupola into the furnace at 2400 degrees Fahr. and then superheated without slag additions to 3000 degrees Fahr.

For any impurity to be removed by slag, it must come in contact with it. By regulation of the stirring the metal in the furnace ladle is brought into intimate contact with the under-surface of the slag which is equally as hot as the metal. In the stirring process, the metal rises rapidly along a vertical line through the center of the mass, spreads out under the lower surface of the slag and then descends along the outer surface of the melt. Thus the metal is cleaned and far more rapidly than it would be if kept entirely quiescent until slag particles ascend to the surface. Chemical reactions of the slag on impurities also are made rapid because in a short time all the metal, due to rapid stirring, will have come into contact with the hot under-surface of the slag.

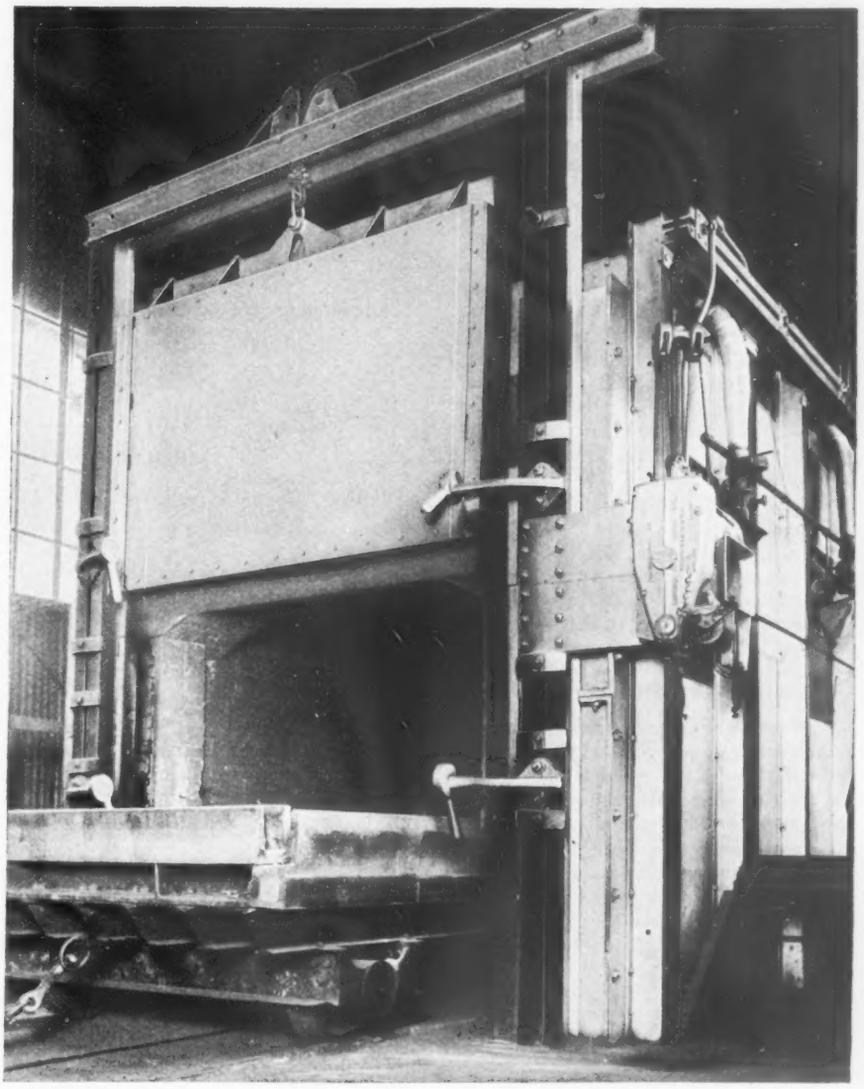
British Institute To Meet

The autumn meeting of the British Institute of Metals will be held in Zurich, Switzerland, Sept. 13-18, at the invitation of the Schweizerische verband fur Materialprufung. A feature of the meeting will be the annual autumn lecture, to be presented by U. R. Evans on "Thin Films on Metals in Relation to Corrosion Problems."

ONE MAN OPENS THIS FURNACE ...IN 30 SECONDS...

with new

R&M ANNEALING FURNACE DOOR ELECTRIC HOIST



With Hand-Lifting Equipment six men were needed to open this annealing furnace door weighing over a ton—and five minutes of hard labor were required to do it. Longer delays were frequently experienced because the terrific heat of the furnace warped the hand equipment in a short time and rendered it immovable until repaired or replaced.

With the R&M Annealing Furnace Door Hoist one man opens the furnace in thirty seconds—simply by touching the controls. There have been no jams or delays due to warping—because the R&M hoist is mounted out of heat range.

A Half Hour's Labor—five minutes' time for six men—is now saved every time the furnace is opened. Think what that means in a year's operation—far more than the cost of this hoist which speeds up the entire shop. Every plant operating an annealing furnace can profit similarly by the use of a durable and dependable R&M Hoist, precision-engineered for safety, service, simplicity and strength.

Write—*today*—for complete details. R&M Hoists are made in capacities to operate any size furnace door, and in types to meet the needs of a hundred other difficult installations.

FEATURES—**R&M Annealing Furnace Door Hoist**

Special furnace door mounting. Hyatt Roller Bearings throughout. Alloy steel gears and pinions. One-piece cast frame of Aremite (*twice tensile strength of grey iron*). Fully enclosed R&M ball bearing hoist motor. Corrosion-proof aluminum finish. One year guarantee. Nation-wide service.

Make Your "Overhead" Pay

Robbins & Myers, Inc.

Hoist and Crane Division: Springfield, Ohio
Branches in principal cities throughout the United States

CANADIAN DISTRIBUTORS: LYMAN TUBE & SUPPLY CO., LTD., MONTREAL, TORONTO, WINNIPEG, VANCOUVER

HAND AND ELECTRIC HOISTS AND CRANES, MOTORS, GENERATORS AND FANS

Nickel-Clad Steel Affords Noncorrosive Surface

BY W. G. HUMPTON, F. P. HUSTON and R. J. McKAY

THE manufacture of nickel-clad steel plate and the fabrication of articles from it has progressed far enough to permit a general description of the working methods used. The product is a relatively heavy plate ¼ or ⅜-inch thick and heavier, with one side coated with nickel, the weight of nickel being of the order of 10 per cent of the whole. The finish is that of hot-rolled steel plate.

The product is designed to fill the growing need for massive containers or other structures with special corrosion-resisting properties. These have been made in the past by lining or covering of shells fabricated of steel. By the proper use of the nickel-clad plate such structures often can be built more efficiently than by the older methods. The heavy weights involved make the use of solid alloy plates uneconomical, and pressure requirements, as well as inconvenience of working, make lining or covering an unsatisfactory procedure.

DUPLEX plate, nickel coated on one side, is one of the latest entries in the field of noncorrosive commodities. The product lends itself readily to various processing methods, as explained in the accompanying article which was presented at the recent annual meeting of the American Institute of Mining and Metallurgical Engineers, New York. W. G. Humpton is metallurgical engineer, Lukens Steel Co., Coatesville, Pa. F. P. Huston and R. J. McKay are associated with the International Nickel Co., New York, the former with the development and research department and the latter as superintendent, technical service, mill products.

Working Conditions Favorable

The working properties of nickel and steel, as used in heavy plate, are well suited to the production of the plates. Proper rolling temperatures are not far apart, and heating and rolling atmospheres can be made to be satisfactory for both. The physical properties at rolling temperatures are close enough to produce uniform sheets without special precautions. Coefficients of expansion also agree sufficiently not to be an obstacle. The only point requiring special attention is the bonding or welding of the metals. The fact that nickel and steel are mutually soluble in all proportions facilitates this and insures a good weld if intimate and forcible contact is secured.

Assuming the production of a good nickel-clad plate, another major problem is the working or fabricating methods properly used to manufacture containers or other articles without loss of valuable properties. The corrosion-resisting surface must be continuous. All joints must be strong and must be so designed as to prevent galvanic or concentration cell corrosion. All sheared edges must be covered and rivets and other joints must be designed to prevent seepage of corrosives to the steel even through the smallest crevices.

It is obvious that the working methods necessary to fulfill these requirements could not reach ultimate refinement in the 16 months since work on this project was begun. The first commercial size equipment manufactured was an 8000-gallon railroad tank car, shown in Fig. 1. This car was completed and put into service, October, 1930.

In the production of nickel-clad plate, relatively thick sections of steel and nickel are placed in intimate contact, heated to a high temperature, and rolled to the finished plate. The bonding of the two metals rests upon the tendency of nickel to alloy with steel at high temperatures to form solid solutions at the plane of contact (Fig. 2).

The first attempts at rolling plate demonstrated clearly the necessity for special handling to effect the bonding of the nickel to the steel. There is no mistaking the nature of the bond, because if the two metals fail to bond the fact is evidenced by the difference in spread of the two during the rolling process. Nickel has much greater strength than mild steel at high temperatures, and will not spread with the steel, when rolling, unless the bond is intact.

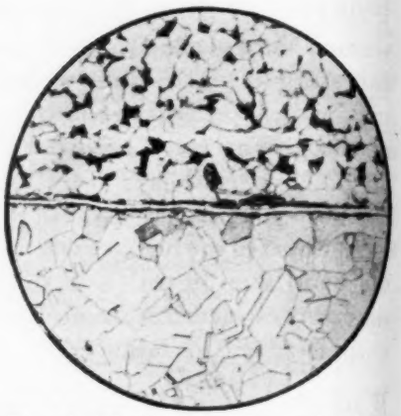


Fig. 2—Photomicrograph of nickel-clad steel showing the solid bond at point of contact. X100

Thickness of Coating Varies

The thickness of the nickel coating on the finished plate may be varied between wide limits by altering the proportionate thickness of the nickel to the steel before rolling. Standards have not been established and a tentative schedule is being used which provides a coating equal to 10 per cent of the total thickness of the plate. The selection of a thickness suitable for a particular use will be made from considerations of corrosion and abrasion. The tank car shown in Fig. 1 was fabricated from the first lot of plate made. More recent developments have enlarged the plate size limits to the standard sizes used for steel tank cars.

Plates for a second car are in process and a description of several recently rolled will be of interest in considering the sizes as compared

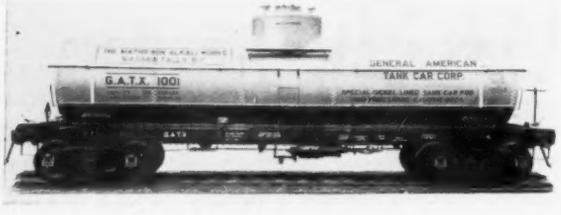


Fig. 1—Tank car of 8000 gallons capacity made of duplex plate and used for transporting caustic soda

We Point with Pride to These Users of

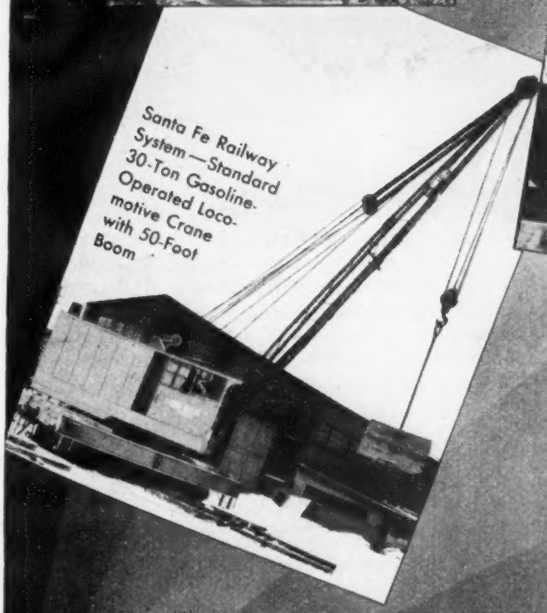
ORTON MATERIAL-HANDLING EQUIPMENT

Semet Solvay Co., Buffalo, N. Y.—Special Electric Broad-Gauge Crane with 115-Ft. Boom and 6-Cu. Yd. Clamshell Bucket for Handling Coal

U. S. Navy—Half-Yard Shovel for Indian Head Proving Grounds

Kentucky Highway Dept.—One of Five Truck Cranes

The Chicago Tribune—Two Special Gantry Cranes Built for Ontario Paper Co., a Subsidiary, for Loading Newsprint into Vessels and for Handling Coal



Santa Fe Railway System—Standard 30-Ton Gasoline-Operated Locomotive Crane with 50-Foot Boom

General Electric Co.—Standard 20-Ton Gasoline-Operated Locomotive Crane Equipped with 55-Foot Boom and 45-Inch Electromagnet

Indicative of the wide endorsement of ORTON Material-Handling Equipment are these pictures of recent installations.

They illustrate ORTON standard machines, and also show special cranes designed and built to solve individual material-handling problems.

Our engineers are at your service if you are planning the installation of new material-handling equipment or are planning a rearrangement of your present facilities.

ORTON CRANE & SHOVEL CO.
608 S. Dearborn St., Chicago, Ill.
Representatives in Principal Cities

ORTON
Cranes, Shovels & Buckets

with steel plate for massive constructions. The bottom shell plate is 382 x 81¾ x 7/16- inches and weighs approximately 4000 pounds. The upper shell plates are 382 x 90 x 5/16 inches; one of the two required for the car was sheared from a finished plate that rolled out to over 490 inches long and had a tightly-adherent nickel coating the entire length. The thickness of the coating is 0.05-inch on all the plates used in the car. Test pieces taken from this 5/16-inch plate show the following increase in strength gained from the nickel,

	Test along edge in common steel	Test about 6 inches from rolled edge including nickel-clad surface
Gage	0.320	0.323
Yield point, lbs. sq. in.	42,200	45,600
Ultimate tensile strength, lbs. sq. in.	51,200	57,500
Elongation, per cent in 8 in.	41.75	29.0
Reduction in area, per cent	72.9	52.8

The duplex plate is 80 to 90 per cent steel. The working properties of the steel portion are in no way different from the properties of a solid steel plate of similar grade. The addition of the nickel in the form of a relatively thin sheet, bonded firmly to one side of the steel, does not alter, to a noticeable degree, the behavior of the plate when subjected to the usual fabricating operations such as bending, pressing, riveting, and welding.

Fabrication Not Difficult

Cold operations, such as bending, flanging, forming, shearing, preparation of rivet holes, and the like, are done as with common steel without the necessity of providing special tools and equipment, or changing the manner of performing the work. Hot operations, such as spinning or pressing head, forming under dies and flanging or flaring, follow the same procedure as with steel so far as the actual temperatures, tools, and manner of working are concerned. The essential difference over steel in working duplex plate is the necessity of providing a means of heating to prevent possible injury to the nickel.

No changes in procedure or tools are necessary to form duplex plate by any of the usual bending methods. Flanges are turned in standard presses or brakes; cylindrical shells are bent in identically the same manner as with common steel, and in planning these operations results obtained on similar work with steel are expected with the duplex plate.

The efficiency of the bond, in its ability to follow closely every change in deformation of the plate, has been demonstrated in the forming of standard flanged and dished boiler heads. Probably the most severe test imposed on the bond is in hot-pressing tank-car heads. These heads are pressed, in a hydraulic press, in a simple die, consisting of a ring and plug without a hold-down pad. The flat circle is pressed, nickel inside, to a finished head 78 inches diameter and ½-inch thick, with a straight flange about 6 inches deep. Due to the fact that no pressure pad is used, the wrinkling is excessive at the edge of the circle as the metal flows into the die, and the bond is subjected to severe shear. The bond is found to be amply strong to withstand this operation without a sign of loosening. Flanged and dished heads have been produced by cold pressing both with the nickel on the convex side and on the concave side. Standard die equipment as ordinarily used for steel was employed.

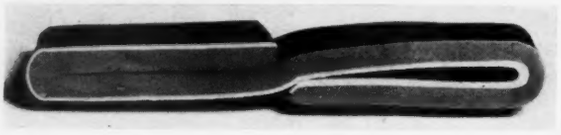


Fig. 3 — Nickel-clad steel plate subjected to bend test

Hot spinning is a severe operation and several heads 60-inch outside diameter of ¼-inch plate have been flanged by this process without indication of rupturing the bond or injuring the metal.

When flanging the duplex plate, where the nickel coating is on the outside of the bend, the elongation of the outside fibers results in reducing the thickness of the nickel over the length of the arc. This is illustrated in an exaggerated manner in Fig. 3, of the bend-test piece. In the design of chemical equipment thinning of the coating sometimes must be taken into account. Bends of this kind may be used in forming heads to be placed convex side to pressure in riveted tanks, or in flaring shells to form top reinforcing curbs, intermediate reinforcing rings, or joints at tube sheets. The loss in thickness at this point may affect the life of the coating when used in service where corrosion of the nickel is appreciable. A factor which makes this loss in thickness less serious is the greater tendency of corrosion to cause failure at the joints, or in pockets, than at the convex surface of the knuckle of bends. It is well, however, to use as large a radius on flanges that are made with nickel outside as is consistent with the design of the vessel and the limitations of the flanging equipment.

Precaution Is Necessary

The use of nickel-clad plate invariably imposes the requirement of a continuous nickel surface to prevent attack on the steel base plate, or contamination of the product by the steel. The effect of galvanic or concentration cell corrosion, set up by the iron-nickel couple in low-resistance contact, may produce, under certain conditions of temperature, aeration and concentration, attack of an order high enough to bring about premature failure. The importance of this factor is stressed in order that the designer may give weight to adequate safeguards. The protection of the steel in lap and butt joints is effected by the use of welding with nickel. Figs. 4, 5, and 6 showing welded joints and a riveted joint indicate the efficiency to be expected.

The preparation of riveted joints, up to the calking stage, should follow good steel practice. The rules set down in the A. S. M. E. boiler construction code on beveling plates, punching and reaming rivet holes, diameters of rivets, pitch and edge distance represent current good practice. Obviously, the steel in the rivet heads cannot be left exposed to corrosion on the nickel side. Five methods of obtaining a nickel surface free from steel have been considered, as follows:

Rivets electroplated with nickel.
Rivets with heads or tips capped with nickel sheet.
Nickel and steel welded rivets, with either heads or tips of solid nickel.
Nickel covering deposited by welding after the rivets are driven.
Solid nickel rivets.

The first method is considered impracticable in preventing corrosion because of the porosity of electroplates. The second, third, and fourth methods have possibilities which may make any one of them

Fig. 4 — Nickel-clad steel plate jointed by butt welding

Three views of the new cutting-off machine designed by Aetna-Standard and built in the Aetna-Standard plant where production facilities are second to none. The machine handles from 6⅝" to 16" O. D. tubes.

This Cutting-off Machine is just One Example...

...of how Aetna-Standard builds for tomorrow as well as today.

FINISHING equipment that is modern, sturdy, accurate... eminently able to compete in today's markets? Of course.

But Aetna-Standard Engineers are *not* satisfied with that alone. They *are experts* ... you'll find none better.

They design and build machinery for the future, too. They have a weather eye on the production methods that are likely to prevail tomorrow. And they plan machinery accordingly ... so that it will be able to compete in *any* market for years to come.

That's why Aetna-Standard equipment, installed years ago, is still operating profitably today.

And it's the reason why, when you want the kind of rolling mill equipment that will keep pace with progress, we say "first call Aetna-Standard."

The AETNA-STANDARD ENGINEERING CO. YOUNGSTOWN, OHIO

OUR BUSINESS IS DESIGNING AND BUILDING MACHINES FOR ROLLING AND FINISHING STEEL.

the best ultimate solution. However, there are complications in each which might cause difficulty, and the method selected for use up to the present time has been the pure nickel rivet.

Plain lap joints, Fig. 6, are calk welded to cover completely the exposed steel on the edge of the plate. Butt joints, strapped on the steel side only, are closed at the junction of the two plates with a bead weld of nickel. This type of joint, if single riveted, is of low efficiency and the double-riveted single butt, while equal in efficiency to the double-riveted lap joint, is wasteful of rivets.

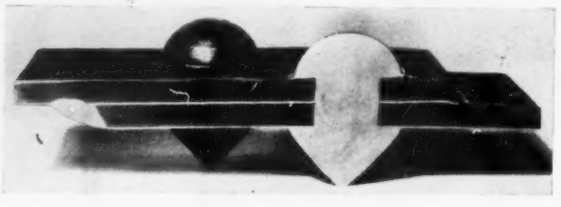


Fig. 5 — Nickel-clad steel lap jointed, double riveted

Requires Interior Calking

Riveted joints should be made pressure tight inside by calking all rivet heads inside. In calking, precaution must be taken not to cut through the nickel or to diminish its thickness seriously. To accomplish this, calking should be done with a tool slightly more rounded on the edge than commonly is used on steel, and the workmen should be instructed to handle the tool so as not to damage the plate.

Welded joints are made in the various types common to steel plate construction; namely, butt, lap and fillet. In butt welding, probably the best practice is to lay the major mass of weld metal in the V made by beveling from the steel side almost completely through the plate. Thus the greater part of the strength of the weld will lie in a steel weld as made by regulation steel methods. A trough of reasonable dimensions, say 1/16 x 1/16-inch for ½-inch plate, thus is left on the nickel side. This trough is filled, using nickel welding rod. By adhering to the procedure outlined later for depositing nickel, the finished butt weld is at least as strong and ductile as an all-steel weld, and does not leave opportunities for direct or electrolytic corrosion. The usual procedure is followed in the steel weld in assembling the joint and depositing the metal.

The joint is prepared to receive the bead of deposited nickel, which is to produce the continuity of nickel surface at the joint, by chipping out the slag and oxidized metal at the base of the steel weld with a diamond-point chisel, or other suitable tool, and removing the oxide or scale from the nickel surface, preferably by grinding, to within about ½-inch from each side of the seam. Peening the nickel weld is usually worth while because it improves the physical properties and insures a dense structure.

The technique best followed in depositing the nickel is that used for solid nickel plate. Metallic-arc or carbon-arc welding methods have been used in the fabrication of the equipment now in service. Gas welding has not been attempted. Weld rods of an analysis particularly selected for welding, when heavily coated with a special flux supplied by the manufacturers, yield strong ductile welds. The regular nickel rods uncoated are apt to produce gassy welds lacking in strength, ductility and soundness.

The heat balance, determined by the thickness of plate, the electrode diameter, and the amperage may vary slightly from accustomed practice with steel welding. Reversed polarity, that is, electrode positive, work negative, is recommended generally for welding nickel. It is estimated that about 75 per cent of the total heat generated by the passage of current through the arc is developed at the positive electrode, the weld rod if polarity is reversed. This may result in insufficient penetration and excessive flow of weld metal, in the case of nickel-clad steel, if the balance is such that the heat energy supplied by the negative terminal is smaller than that required to fuse the base metal and effect complete fusion with the molten metal transferred from the rod. The most practical means to determine this balance is by trial. The welder adjusts the current setting and selects the polarity to suit his individual method of welding. In general, the electrode diameter and current setting will follow closely that ordinarily used in welding steel plate.

The efficiency of the bond in transmitting heat is convincingly demonstrated in both the rolling during production and in subsequent heating for hot work. In some of the early experiments indifferent results were obtained. Certain areas failed to bond and at these points the insulating effect of the gas films was readily seen in the difference in temperature of the steel compared to surrounding bonded areas. The nickel lost temperature rapidly, which resulted in reducing the amount of heat given up by the steel. In reheating the properly bonded plate, the section increases uniformly in temperature over the whole area and in cooling the same uniformity is noted. The detection of unbonded areas is prompt and certain. The practical importance of the high transfer efficiency is in the construction of jacketed vessels and heat transfer equipment. The duplex plate eliminates the defect of low transfer obtained in vessels lined with sheet.

The main difference in heating nickel-clad plate for hot work, over that used for steel is the necessity of providing a fuel sufficiently low in sulphur to prevent damage to the nickel. A peculiar intercrystalline attack results when nickel is exposed to the action of sulphur-bearing compounds at temperatures within the range of hot working. The attack begins on the grain boundaries at the surface, and progresses inward at a rate dependent on the amount of sulphur present, the temperature, and the time. The affected portion of the metal suffers a complete loss of ductility which, under subsequent bending operations, results in a network of fine line surface cracks, or numerous deep cracks which under bad conditions may extend completely through the coating, depending on the extent of the damage.

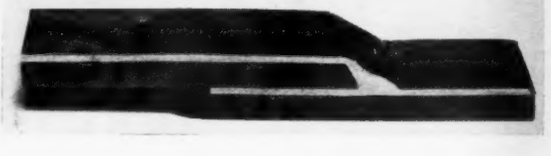
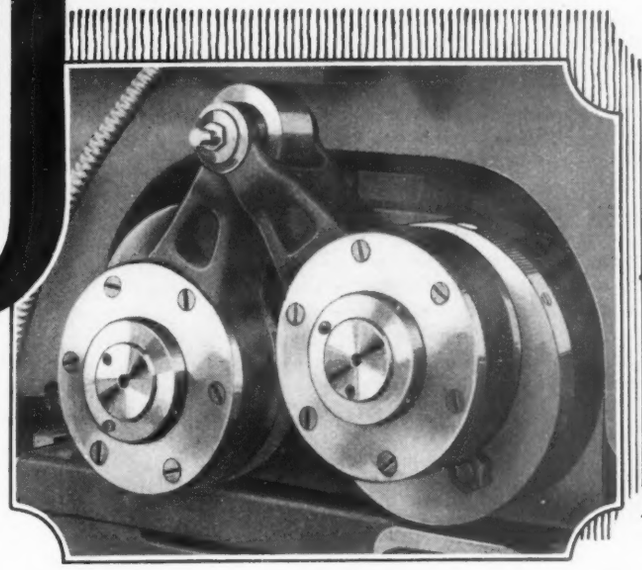


Fig. 6 — Nickel-clad steel plate jointed by lap welding

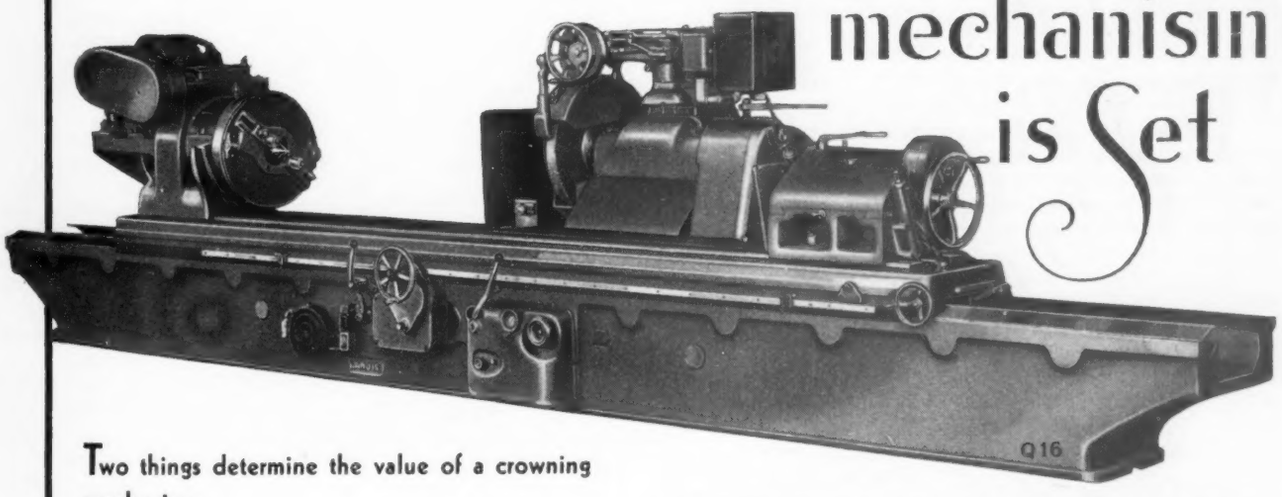
Many Fuels Are Suitable

Satisfactory fuels for plate work are those having a sulphur content not over ½ per cent. Among these are acetylene, natural gas, city gas, and washed producer gas, light distillate oils, including kerosene and gasoline, charcoal, "blacksmith" coal and coke from coal treated to reduce the sulphur to a safe limit. The fuels most apt to embrittle the nickel and cause excessive cracking on bending are high sulphur coal and coke as extensely used in pit forges in plate shops. The thickness of the nickel coating is not great and no considerable damage

Just a Twist of the Dials



And the new LANDIS crowning mechanism is Set



Two things determine the value of a crowning mechanism.

First, it must consistently produce work within close limits of accuracy.

Second, it must be easily and quickly set.

The new Landis dual eccentric type crowning and concaving mechanism, being both accurate and easily set becomes, therefore, an ideal mechanism. Used in connection with the new Landis Hydraulic Roll Grinders it has gained favor rapidly in the steel making industry.

Many have acquainted themselves more fully with it by securing a copy of catalogue H-30. Have you?

LANDIS TOOL COMPANY

WAYNESBORO. PA.

DETROIT CHICAGO NEWARK PHILADELPHIA

62

from sulphur can be tolerated. The use of the proper fuel is of utmost importance.

Given a satisfactory means of heating, good steel practice will provide proper conditions for hot work. The critical temperature at which nickel changes its structure and suffers a complete loss of ductility is slightly above 2300 degrees Fahr. While it is barely possible that steel plate might be heated as high as 2300 degrees, it is not likely that this temperature will be reached.

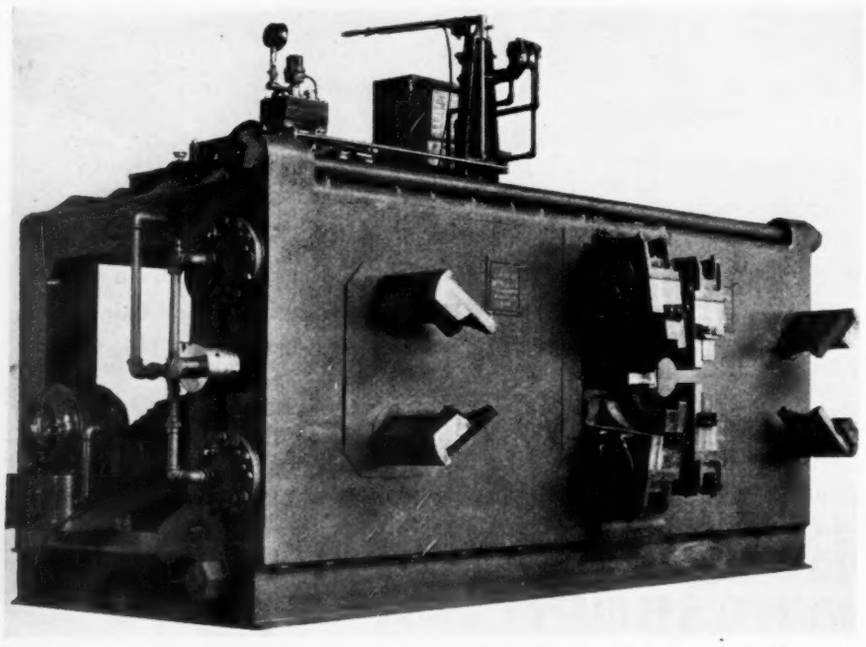
The heating of nickel rivets obviously requires the same care in the selection of a fuel of low-sulphur content. While it is not impossible to use coal or coke forges in heating nickel rivets, the possibility of "burning" the rivet is great. If such forges must be used a deep fuel bed must be maintained and excessive blast avoided. Heating must be rapid and the rivets drawn immediately on reaching the proper temperature. The practice of holding steel rivets in the forge during a lull in driving, by cutting off the blast, cannot be done successfully with nickel. For air driving the 1800 to 2000-degree range used in steel is proper. Hydraulic driving is best done at temperatures not over 1500 degrees Fahr., which agrees with steel practice.

The tank car for which these working methods were used is in service in the transportation of caustic soda of high purity requirements for the manufacture of rayon. It is outside the scope of this article to give a full description of the properties and uses of heavy nickel-clad plate. However, it should be said that the plate as made has the same corrosion-resisting properties as pure nickel, as distinct from nickel electroplate. Under proper fabricating control this corrosion resistance can be relied on until the nickel plate disappears by corrosion or wear. By the fabrication method described, there is no loss in strength over that of an all-steel structure, and within the limits defined most containers and structures now made of steel can be made of the nickel-clad plate.

Welder Produces Double Pipe Lengths In 2 to 16-Inch Diameters

TEN months ago the Taylor-Winfield Corp., Warren, O., constructed and installed in a large steel plant a resistance welding machine for producing double-length steel pipe by butt welding together two standard sections. This machine, described on Page 56 of the Sept. 11 issue of STEEL, handled diameters from 2 to 10 inches and in production exceeded expected output by almost 100 per cent.

Now the company has built and recently shipped a larger unit having a much wider range of capacities. This machine, shown in the accompanying illustration, accommodates diameters from 2 to 16 inches and welds together two standard lengths to make lengths of approximately 48 feet. The unit weighs 65 tons, but its feature is flexiblity and strength which makes it possible for a single machine to handle so wide a range of pipe sizes.



Resistance machine which butt welds together two standard pipe sections to form lengths of approximately 48 feet

Controls Are Convenient

An upset pressure of 200,000 pounds is available when required. Operating controls for the air clamping, hydraulic automatic and electric energy, are located conveniently on top of the machine where the operator is able to see the pipe and weld without changing position. The hydraulic automatic feature is responsible for the wide range of pipe sizes which can be handled. The upset can be adjusted quickly to suit small or large diameter pipe, also the welding time can be changed from 4 to 40 seconds by adjusting a dial. The length of stroke for the burn-off can be changed by a set screw.

Adjustments on the hydraulic automatic unit to change from one size pipe to another require only a few seconds. The welding dies and back-up shoes must also be changed to suit the pipe size and these are equally convenient to install. The transformer, which accomplishes the welding, provides not only a great range of secondary voltages but also various ampere capacities. The multicoil system was adopted, affording four different secondary voltages for each capacity, or a total of 16 heating rates. Another important feature is the placing of the transformer close to the weld, this feature, along with the close loops in the flexible connections to the clamping jaws, accounting for the high power factor attained.

In addition to the 2 to 10-inch and 2 to 16-inch units, the same type welder is available with capacities from 1½ to 6 and 14 to 24 inches.

Nails of Acid-Resisting Alloy Used in Flume

Water carried in a wooden flume in mining operations of the Phelps-Dodge Corp., Bisbee, Ariz., have a relatively high acid percentage, so high that ordinary steel nails corrode quickly and frequent replacement has been necessary to keep the flume intact. Some 15 months ago the company adopted nails made from an acid-resistant alloy and today the nails are in good condition. The alloy, a 12 to 16 per cent chromium iron formerly known as Ascoloy 33 and now as Allegheny 33, was made by the Allegheny Steel Co., Brackenridge, Pa.

Corrosion of Pipe Lines Takes Large Annual Toll

CORROSIVE effects of the widely varying soils in which they are buried, the electrical currents generated by the pipe lines themselves acting as a primary cell and the minor effects of the gas, oil and water transported are costing the owners of the 300,000 miles of pipe buried in this country $100,000,000 annually, according to K. H. Logan, electrical engineer, bureau of standards, Washington. Mr. Logan, head of the bureau's underground corrosion section, states that much of this loss can be prevented by the proper selection of pipe materials and the application of suitable protection to the lines in corrosive soils.

With the assistance of public utility organizations, the bureau of standards is undertaking to determine the causes of underground corrosion, methods of identifying corrosive soils, the characteristics which a satisfactory pipe coating must have, and methods for ascertaining whether a coating is suitable for a given soil condition. Nearly 20,000 specimens of materials, comprising several kinds of iron, steel, brass and copper pipe, a variety of alloys intended for service under special conditions, and a large number of metallic and organic coatings are under observation.

How Tests Are Conducted

At two-year intervals some of the specimens of pipe are removed and returned to the bureau for study. The rates at which they lose weight and at which pits deepen are determined. When sufficient data have been collected, it will be possible to predict the life of the several pipe materials in various soils and to determine which material is best adapted to any local condition. These data and corresponding data on the behavior of protective coatings will enable the engineer to select the most economical protection for new pipe lines and old ones that have to be reconditioned.

The protection of a pipe line costs from a few hundred to a thousand or more dollars per mile. It is desirable, therefore, to apply protection only where and to the extent that it is needed. To aid in determining the location of the corrosive localities along a proposed pipe line, and to assist in the selection of suitable protection, several studies are under way. Preliminary results indicate that in the heavy clay soils of the East the acidity of the soil is an important cause of corrosion, and methods of measuring soil acidity have been developed. Farther west many soils are neutral or alkaline in their reaction. In such soils the electrical conductivity of the soil seems to be important, and simple methods for determining soil conductivity are being worked out.

Studies conducted during the past two years indicate that most long pipe lines carry electrical currents and that corrosion occurs where these currents leave the lines. Formerly it was believed that such currents were confined to regions in which electric railways were operated and that they were caused by leakage from railway tracks. It now appears that in addition to the currents from street railways, pipe lines carry current generated at the surface of the lines much as current is produced in a primary battery.

The discovery of these pipe-line currents and their relation to corrosion furnishes a means by which the owner of a line can locate a large portion of the places where his line needs reconditioning and enables him to prevent much of the expense formerly necessary to maintain oil lines.

The most common method of protecting pipes against soil action is to cover them with bituminous material such as coal tar pitch or asphalt. Greases and paints also are used for this purpose. Indications are that the thin bituminous materials offer insufficient protection against severely corrosive soils on account of the pinholes which nearly always are present. Moisture penetrates most thin bituminous coatings.

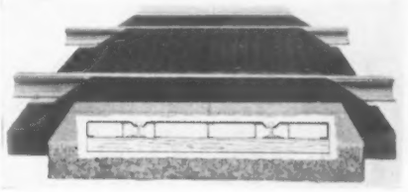
Coating Is Reinforced

Since bituminous materials are essentially viscous fluids, they tend to flow under the weight of soil and pipe, leaving too little protective material at points of maximum pressure. To avoid this trouble, it is customary to reinforce the bituminous material by the addition of some finely powdered solid or by incorporating a wrapping of cloth or felt. There are on the market between 10 and 20 rather extensively used coatings and perhaps 50 newer and lesser known products. All of these have their advocates, but actual data on the ability of any of the coatings to protect lines are not extensive, and for the newest types such information is almost entirely lacking. From the standpoint of both manufacturer and consumer it is desirable that additional information on the performance of protective coatings be obtained. The bureau of standards is, therefore, co-operating with the American Gas association, the American Petroleum institute, the Underground Pipe Protection institute, and independent manufacturers of protective coatings, in field studies of the behavior of a large number of proprietary coatings applied to short lengths of pipe and to working lines.

All-Steel Sidewalk Crossing Provides Safety

A new type of all-steel sidewalk crossing for railroad intersections has been developed by Joseph T. Ryerson & Son Inc., Chicago. Designed to provide safety for pedestrians and long wear with practically no maintenance expense, the crossing consists of heavy rolled steel plates with a raised diamond pattern tread, assembled into a level, unobstructed walking surface.

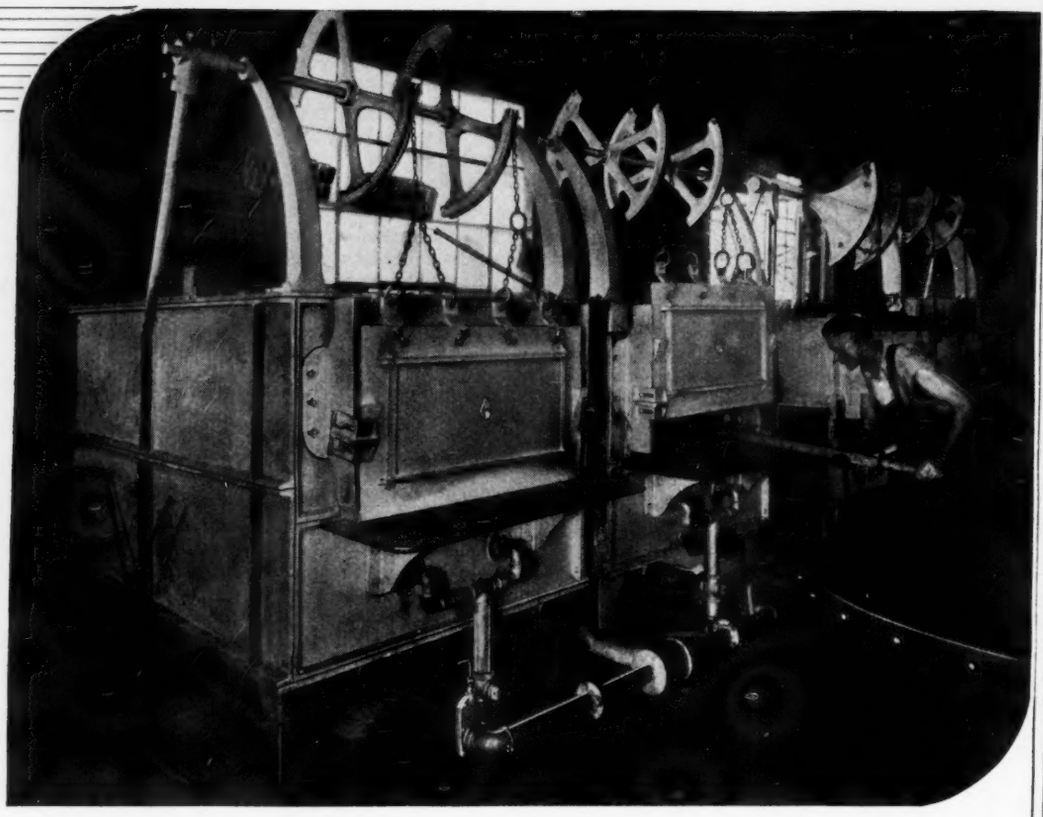
As shown in the accompanying illustration, the crossing is constructed



in three units, the center and two outer sections. The center section is placed between the rails with the flanged ends fitting snugly under the ball of the rails on either side. The two outer sections are flanged also under the ball of the rails, and when placed in position they form a span level with the rails and the sidewalk. The channels and zees which make up the under part of the crossing rest directly upon the ties.

In the process of manufacture the ends are formed downward, and when the crossing is installed these ends serve to hold the entire crossing in place as they are spiked firmly to the ties. With the ends sloped to the ties and fastened securely in this manner dragging brake beams, chains, etc., on moving trains cannot catch on the crossing, thus eliminating the danger of derailments.

This method of construction is claimed to eliminate nearly all maintenance expense and also reduce the cost of rail repairs at sidewalk intersections because of the ease with which the section is installed or removed for work on the tracks. Less than 30 minutes time is required to install or remove the crossing completely. As a protection against corrosion the underside of the crossing is coated with tar, asphalt or red lead.



AND HERE IS A REAL PERFORMANCE RECORD

IN an Ohio plant two heat-treating furnaces produce one-third more with the same fuel consumption—

The uniformity of the heat treatment is improved to a marked degree—

There is decidedly less scale—the quality of work far better—

And when it comes to production, the two furnaces equipped with "Carbofrax" Hearths do practically as much work as four having hearths of ordinary fireclay.

"Carbofrax", the Carborundum Brand Silicon Carbide Refractory—makes such performance records possible because of its high heat conductivity—its refractoriness—its freedom from softening or fluxing.

"CARBOFRAX" HEARTHS

REG. U. S. PAT. OFF.

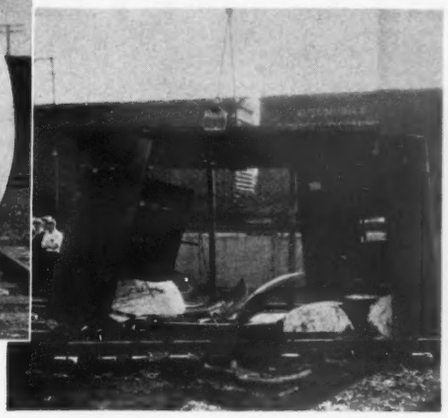
MADE FROM CARBORUNDUM BRAND SILICON CARBIDE

THE CARBORUNDUM COMPANY, PERTH AMBOY, N. J.

REG. U. S. PAT. OFF.

CHRISTY FIREBRICK COMPANY, ST. LOUIS, KANSAS CITY, NEW ORLEANS, HOUSTON
PACIFIC ABRASIVE SUPPLY CO., LOS ANGELES, SAN FRANCISCO, SEATTLE
WILLIAMS AND WILSON, LTD., MONTREAL-TORONTO, CANADA
HARRISON & COMPANY, SALT LAKE CITY, UTAH
DENVER FIRECLAY CO., EL PASO, TEXAS

(CARBORUNDUM AND CARBOFRAX ARE REGISTERED TRADE MARKS OF THE CARBORUNDUM COMPANY)



WELDED spherical steel storage vessel for helium gas is shown at the left. Tested to destruction by internal pressure, the tank failed as shown below.

Spherical Steel Storage Tank Blown to Pieces in Test

TO DEMONSTRATE strength and to furnish data on a new type of high-pressure container for transporting and storing helium gas used by the United States navy, A. O. Smith Corp., Milwaukee, culminated a lengthy test program on May 15 by spectacularly blowing one of the tanks to pieces. This final test, performed at the Smith plant, was witnessed by officials of the government, the navy and regulatory bodies.

The vessel, shown in one of the accompanying illustrations, was one of a group now under construction for the navy and was spherical in shape, 7 feet 10 inches in diameter. It was fabricated from heavy alloy steel plates welded together by the Smith process of arc welding. After passing the regular acceptance tests, it was mounted on a turntable and while under a pressure of 2360 pounds per square inch was hammered with powerful air hammers for 72 consecutive hours. More than 30 million blows were struck during this time.

Pressure Is Increased

Following this terrific punishment, the sphere was placed on a steel foundation and while under 2620 pounds pressure, a pressure corresponding to 64 per cent of the yield point, a heavy weight was dropped on it from a height of 23½ feet. The skull cracker weighed close to 1 ton, thus delivering a blow in the neighborhood of 11 million foot-pounds per second. This might be compared to a 10-ton weight being stopped within a 4-foot distance while moving at 30 miles per hour. This test was made first on the pole and then on the weld; in each case the weight made a dent about 13 inches diameter and 3/16 inch deep.

The final test was to raise the pressure until failure occurred. Heavy steel guards were placed around the ball and ingenious instruments connected to record the behavior of the vessel as it approached destruction. The vessel finally failed at a pressure of 5700 pounds per square inch, as shown in the illustration.

While the data obtained must be studied and interpreted before a full report can be prepared, those present expressed satisfaction with the performance and the demonstrated safety of this type of vessel. It was pointed out that tests to destruction are the only dependable means for evaluating correctly new designs and constructions.

Testing Materials Society Nominates Officers

The first international congress of the new International Association for the Testing of Materials is to be held in Zurich, Switzerland, Sept. 6-12. The technical program will be divided into four main groups, namely, metals, nonmetallic inorganic materials, organic materials, and questions of general importance.

Under the heading of metals, subjects to be discussed are: Cast iron, strength of materials at high temperatures, fatigue, notched-bar impact tests, and progress of metallography. Questions of general importance will include: Fundamental and test relations between elasticity and plasticity, toughness and brittleness; determination of grain size in loose materials; and calibration and accuracy of testing machines.

Steel Industry Owes Spectacular Growth To Ingenuity of Engineers

EDITOR'S NOTE—The following remarks were delivered by F. O. Schnure, president, Association of Iron and Steel Electrical Engineers, on the occasion of a Westinghouse radio salute to engineers of the iron and steel industry, Sunday evening, May 31, over radio stations associated with the blue network of the National Broadcasting Co.

THIS is an age of progress and of accomplishment, largely brought about by the almost universal use of steel. The amazing growth of the steel industry has been due to the ingenuity of man, the engineer of today, the man who plans, who designs, who builds and who operates steelmaking equipment.

Few people realize the scope of the steel industry. Ore is brought from all corners of the earth, coal from the depths of the earth, and with these raw materials and natural resources at hand, the engineering achivements of the past 75 years have been so rapid and so varied as to defy enumeration.

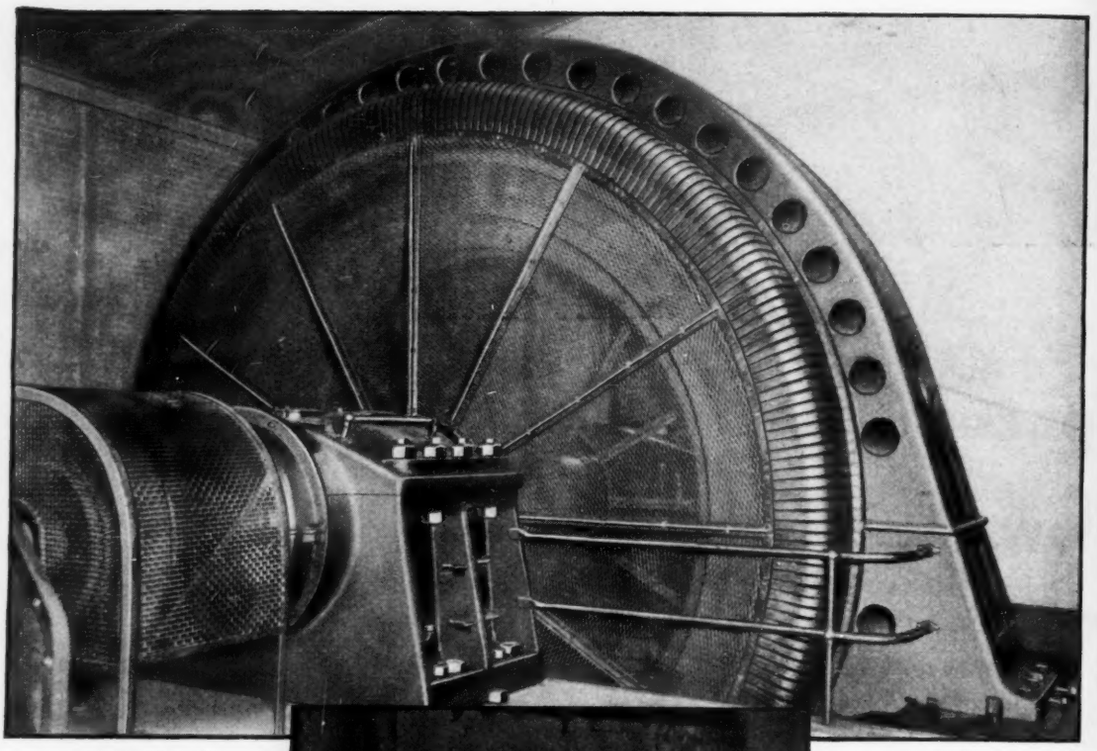
In the past few years we have seen the 400-ton blast furnace suplanted by the 1400-ton furnace; the open-hearth furnace production increased; the rolling mill electrified and mechanized.

All of these improvements have been brought about through the fundamental idea of producing better grades of steel at lower costs, both of which are reflected in a multitude of improved low cost commodities used by the public.

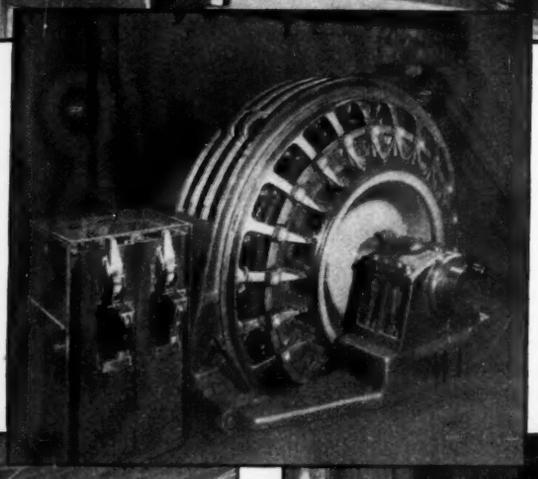
Outstanding in these achievements in the production of steel is the modern car dumper, the ore bridge, the automatically operated skip hoist, the turboblower, the automatic stock distributor and recorder, the hot metal transfer car and mixer, the charging machine, the dolomite thrower, the gigantic and massive ladle crane.

Perhaps the most spectacular progress has been brought about by the intensive application of electricity to

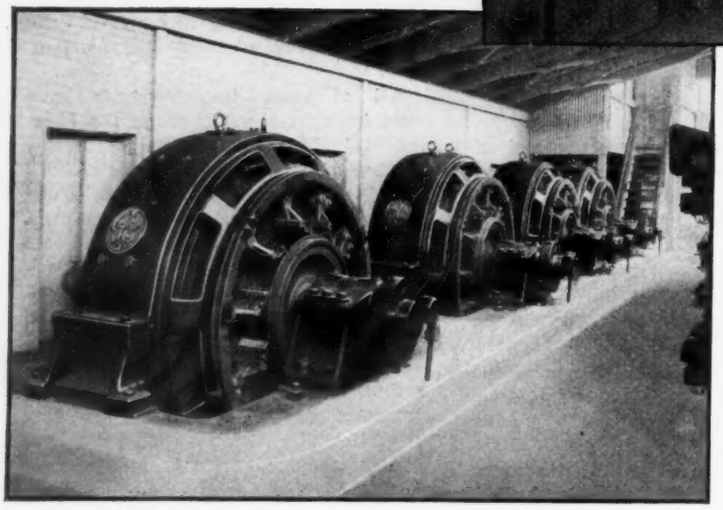
THROUGH THE STEEL



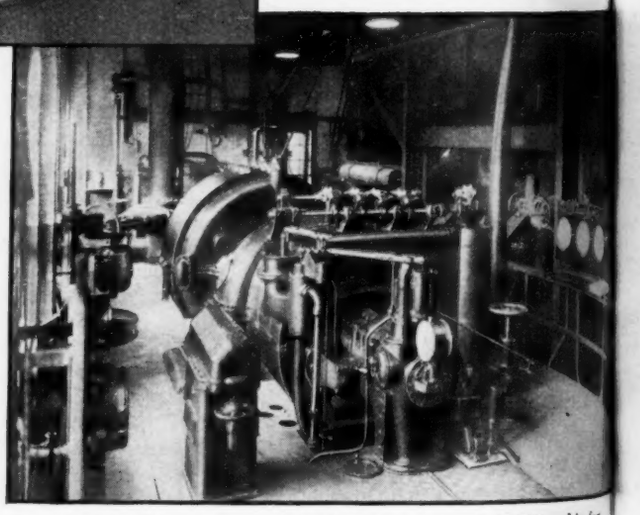
(Above)
G-E 9000-hp., 107-rpm., synchronous motor driving a 21-inch — 18-inch bar mill. This motor has a higher continuous rating than any other industrial motor



(Left)
G-E 4000-hp., 58/140-rpm. motor for the 34-inch reversing blooming mill in one of Cleveland's well known steel plants



Four G-E 800-hp., adjustable-speed, d-c. motors driving the finishing stands of a 12-inch merchant mill in a Cleveland mill

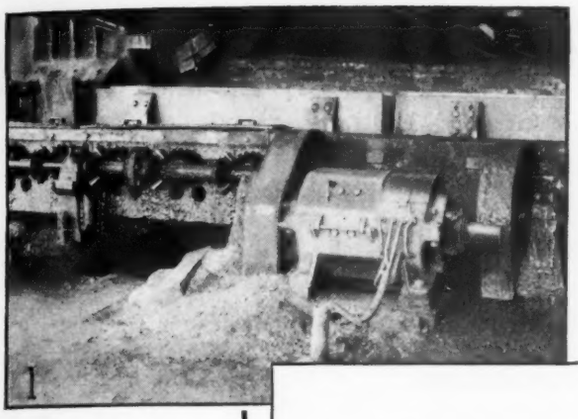


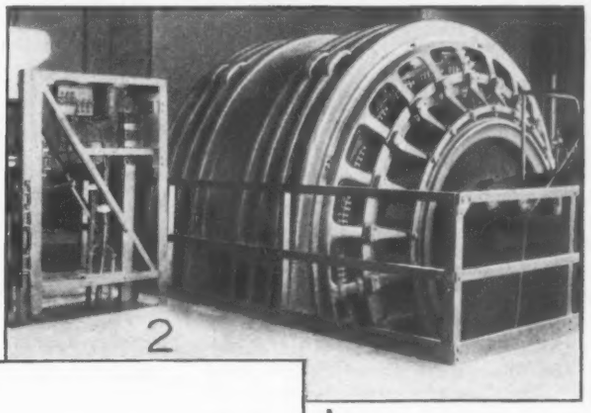
G-E turbine-driven centrifugal compressor rated 33,000 cubic feet per minute at a pressure of 28.5 pounds per square inch. This unit supplies air for a blast furnace in a Cleveland steel plant

MILLS OF CLEVELAND

In Cleveland—an important steel center, and host this year to the annual convention of the A.I. & S.E.—as in other great steel centers throughout the nation, General Electric equipment has won the confidence of the iron and steel industry by its consistent excellence and its unfailing reliability year after year.

Whatever the electrical needs of this major industry, General Electric meets them to-day and steps steadily ahead with design and manufacture in anticipation of greater needs to-morrow. There is a G-E office near your plant, and there you will always find capable specialists who are ready to help you solve every power problem.



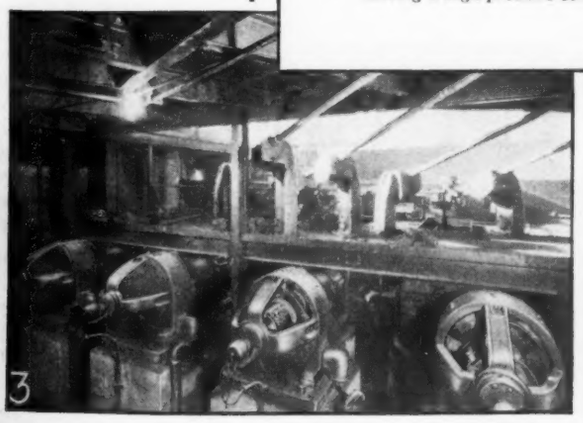


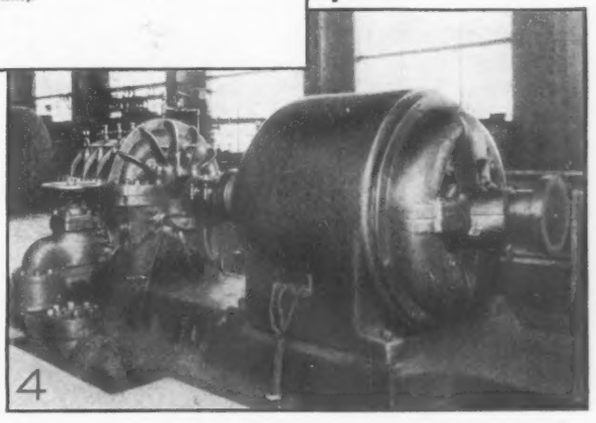
1. *G-E Type MD-408, 25-hp., 575-rpm. motor driving furnace delivery table in a Cleveland steel mill*

2. *The largest reversing motor in the Cleveland district—a G-E 6500-hp., d-c., 50/120-rpm. drive for a blooming mill*

3. *Four G-E 50-hp., 500/1500-rpm., d-c. motors driving rod reels in a Cleveland steel plant*

4. *G-E high-speed induction motor rated 700 hp., 1500 rpm., 6600 volts, driving a high-pressure centrifugal pump*





JOIN US IN THE GENERAL ELECTRIC PROGRAM, BROADCAST EVERY SATURDAY EVENING ON A NATION-WIDE N.B.C. NETWORK

200-491

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

the rolling mills. Here and there, at strategic points in the modern steel mill, a handful of men control the motors driving the equipment that transports, handles and processes the steel ingot on its way to ultimate product. Application of power has lifted the burden of heavy toil from the back of labor.

The vacuum tube, developed for radio communication, is now playing a prominent part in the production of steel. The smallest motor, as well as the huge 30,000-horsepower motor, can be made to bow to this tube's wonderful control.

Speed and accuracy have reached the point in rolling mill practice where one end of a rough piece of steel is still in the heating furnace, while the other end in the form of a finished bar or strip has reached the shipping department a thousand feet away.

Standardization an Aid

One of the greatest aids in this development has been the standardization of fundamental parts and machines. Outstanding in these is the standardized mill-type motor, which, through the constructive efforts of the standardization committee of the Association of Iron and Steel Electrical Engineers, has been accepted by the electrical companies. This standardization has helped to reduce steel mill maintenance expense, and has lowered renewal costs and inventories—all of which helps the steel manufacturer to make better steel at less cost.

In conclusion, it may be said that the achievements and accomplishments in the iron and steel industry have not been brought about by any individual group or class of men; the executive at his desk, the operator in the plant and the laborer with his shovel, all have contributed their thoughts and ideas which have brought about the success of this industry today.

Convention Calendar

June 4-5—Associated Machine Tool Dealers. Semiannual convention at Granville Inn, Granville, O. A. G. Bryant, 2558 West Sixteenth street, Chicago, is secretary.

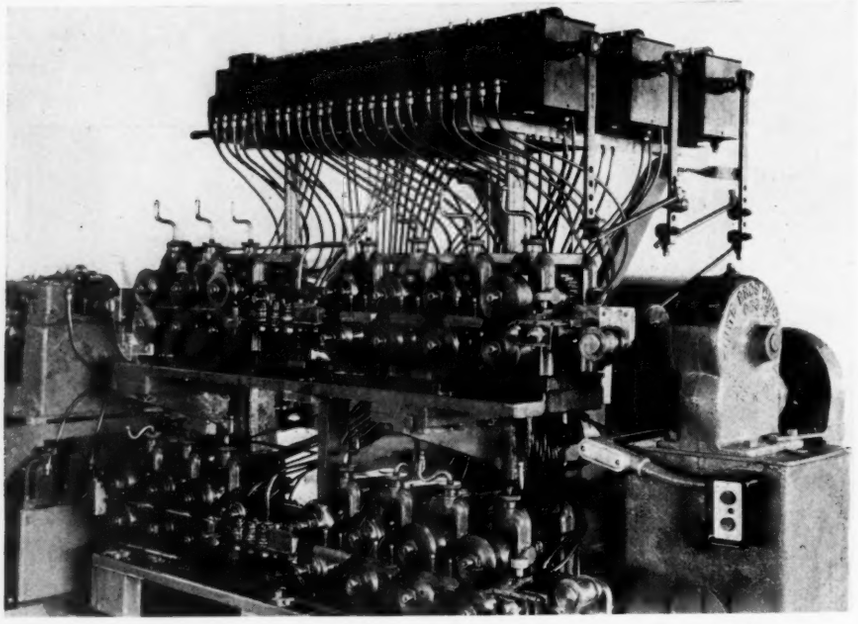
June 8-11—National Association of Purchasing Agents. Annual convetion and "informashow" at Royal York hotel, Toronto, Ont. G. A. Renard, 11 Park place, New York, is secretary-treasurer.

June 15-16—American Society of Mechanical Engineers. National applied mechanics meeting at Purdue university. Lafayette, Ind. Calvin W. Rice, 29 West Thirty-ninth street, New York, is secretary of the society.

June 15-19—Association of Iron and Steel Electrical Engineers. Annual convention and iron and steel exposition at Public auditorium, Cleveland. John F. Kelly, 1030 Empire building, Pittsburgh, is secretary.

June 22-26—American Institute of Electrical Engineers. Annual summer convention at Asheville, N. C. F. L. Hutchinson, 33 West Thirty-ninth street, New York, is secretary.

June 22-26—American Society for Testing Materials. Annual meeting and exhibition of testing equipment at Stevens hotel, Chicago. C. L. Warwick, 1315 Spruce street, Philadelphia, is secretary.



250 *FEET OF COPPER TUBING KEEPS OIL ON 72 BEARINGS*

A battery of three 24-feed mechanical lubricators in use on a machine that forms tubes for automobile radiators. The installation was designed and built by the McCord Radiator & Mfg. Co., Detroit. With this battery of force-feed lubricators the 72 bearings on the machine are kept covered constantly with a thin film of oil, thus protecting them against corrosion, acid and acid fumes, besides minimizing friction. Bearing life thereby is prolonged appreciably

Electroplates Tungsten by Newly Developed Process

Through a new process recently developed by Dr. Colin G. Fink, electrochemical department, Columbia university, New York, it now becomes possible to electroplate pure tungsten. The new plate appears even whiter than silver and does not tarnish when exposed to air. Previous attempts to plate this element have met with failure.

Tungsten is one of the hardest of metals, being twice as hard as chromium and has a melting point of 8000 degrees Fahr. Unlike other metals used for plating, it is insoluble in the strongest acids. Tungsten plate, it is said, is most likely to be used most widely in industries depending on chemical processes where resistance to heat and acid is important. Its hardness, good heat conductivity and high melting point make it particularly suitable for electrical and arc points subject to great temperature changes.

A comparison of tungsten with other metals, according to Dr. Fink, shows the desirability of a tungsten coating. Cadmium, silver and nickel are all duller and have a much lower melting point. Chromium is almost equally bright, but it melts at a much lower temperature and is soluble in hydrochloric acid.

The new process involves the passing of an electric current through a water solution of sodium tungstate. Deposits of metallic tungsten have been successfully produced on a variety of metals, including brass, copper zinc, aluminum and iron, also carbon. The tungsten deposit was said to be smooth, hard and coherent, having a high luster.

Chromium plating, which has been used widely because it is decorative and offers efficient protection against atmospheric corrosion, was also developed by Dr. Fink in 1922.

Steel Treaters Schedule More Convention Papers

The tentative program of the annual convention of the American Society for Steel Treating to be held in Boston, Sept. 21-25, in conjunction with the National Metal congress and exposition, schedules 65 technical papers. This is an increase of more than 50 per cent over the number presented at the congress held last fall in Chicago. The variety of subjects is widened correspondingly.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

Duralumin Corrosion

Corrosion in duralumin rivets and its pertinent relation to manufacturing methods, discussed by J. E. Sullivan, in Aviation, June 1931, *p.* 347, 3 *pp.*, 5 *illusts.*

After heating dural rivets to the prescribed temperature, usually 950 degrees Fahr., and holding at this temperature for the required time, they should be plunged into cold water above 150 degrees Fahr. The time of transfer from furnace to quenching bath should be held to a few seconds. Under normal working conditions, rivets should be driven within 30 minutes after heat treating. It recently has been discovered that it is possible to obviate close co-ordination between quenching and pointing by placing the quenched rivets in a container maintained at a temperature of 32 degrees Fahr. or lower and withdrawing them as required. A number of float manufacturers have found that painting the areas around rivet holes just prior to the insertion of anodically-treated rivets has produced good results. The anodic film not only retards corrosion but provides a base to which other protective coatings adhere tenaciously.

—STEEL, 6-4-31

Sulphur in Mild Steel

Influence of this element and manganese in mild steel, discussed by Bernard Thomas, in the Iron and Steel Industry (London), May 1931, *p.* 259, 1½ *pp.*, 1 *illust.*

Where forging operations have to be carried out, up to 0.10 per cent sulphur can be worked satisfactorily providing manganese is present to the extent of 1.40 per cent. Such steels while in the form of plates or sheets, are suitable for press work, because the material takes impression in an excellent manner. When present in certain amounts, sulphur can produce red shortness in steel. Manganese, however, reduces the danger considerably by combining with sulphur, but the resulting sulphide is liable to segregate and cause unsoundness in another direction by promoting the growth of large crystals in ingots, which constitute areas of weakness. The possibility of segregation, when both elements are present is considerably less than the possibility of red shortness in the absence of sufficient manganese. In the interest of those who are in doubt as to suitable proportions of the two elements the author shows a graph which gives the percentages of manganese necessary with various percentages of sulphur in order to prevent the occurence of red shortness during working operations.

—STEEL, 6-4-31

Vacuum Tubes

New uses for vacuum tubes in industry, Electrical Production, May 1931, *p.* 2, 2½ *pp.*, 4 *illusts.*

A successful application of the vacuum tube is in the control of spot welding operations. By proper arrangement of transformers and thyratron tubes in connection with a cam-operated switch it is possible to make 1000 spot welds per minute, contrasted with the limit of about 100 when a contactor system is used.

Similarly the thyratron tubes can be arranged to control line welding, in which the welding is continuous, not intermittent as in spot welding. Synchronization of machine speeds and conveyor speeds can be accomplished nicely by the use of these tubes.

Combinations of photoelectric cell and thyratron tube are used to control incandescent lamps and many of these installations have been made in industrial plants and elsewhere. A number of other applications are cited in brief.

—STEEL, 6-4-31

Rust Prevention

Protection of steel mill equipment during lay-over periods, discussed by Bernard Jeffs, in Black and White, June 1931, *p.* 14, 2 *pp.*, 1 *illust.*

A half-and-half of high-grade rust preventative and kerosene oil provides an excellent protective film for use on roll necks and rolls during lay-over periods. Although this mixture of rust preventative will dry on the metal parts, the first two or three revolutions of the rolls will remove it thoroughly from the necks, and the first passes of metal will remove it from the rolls. The rust preventative best suited for the protection of tools, parts, etc., is one of the nondrying grades. In the case of scientific instruments, delicate machine parts, etc., it may be desirable to use a rust preventative of the drying variety which imparts a hard, dry, nonporous film. This will protect the parts over lengthy periods and can be removed with a solvent.

—STEEL, 6-4-31

X-Rays and Steel

Special abilities of the X-ray in following the effects of metallurgical processes, discussed by R. L. Davidson, in Pure Iron Era, second quarter 1931, *p.* 16, 2¼ *pp.*, 3 *illusts.*

The method commonly used by which X-rays can be made to disclose the inner structure of all kinds of crystals is explained in a nontechnical manner and the effects of rolling steel interpreted. Such terms as random orientation, atomic planes, plane families and lattice are discussed. The reader readily can grasp the conception of how X-rays interact with crystals to yield patterns from which their structure can be determined by the details considered.

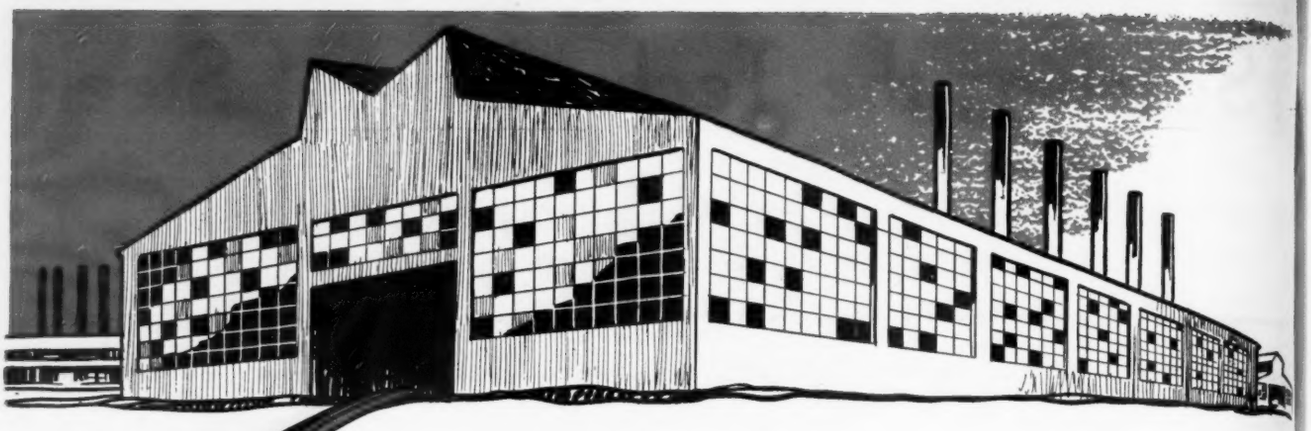
—STEEL, 6-4-31

Flue Gas Corrosion

Effects of combustion products on power plant equipment, discussed by H. F. Johnstone, in Power, May 26, *p.* 824, 4 *pp.*, 5 *illusts.*

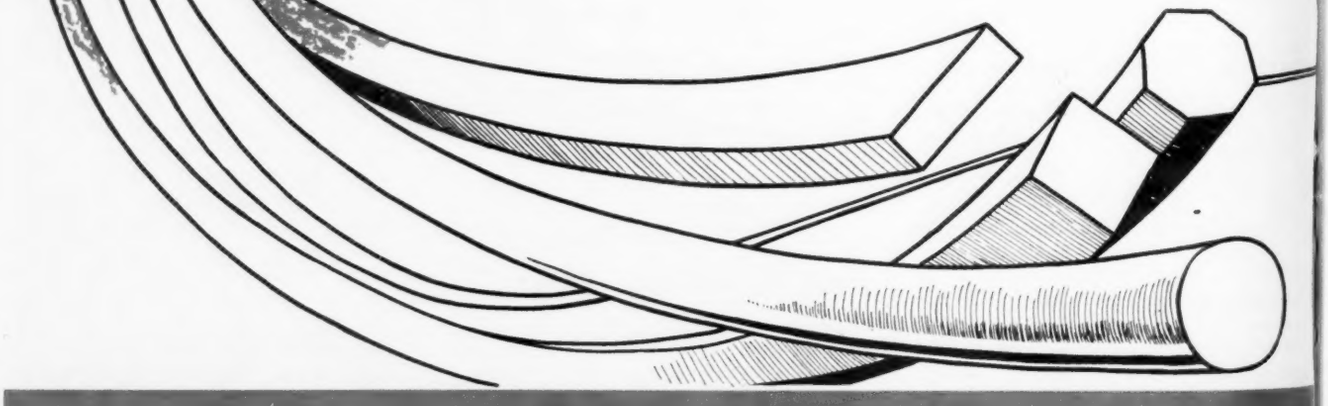
Corrosion is most often present when the sulphur of the coal is above 2 per cent. High-sulphur coal does not always produce corrosion. The zone of maximum corrosion is usually that in front of the air preheater intake. It is most prevalent from high-ash coals and under those conditions of operation in which a large draft is employed, so that a great deal of flue dust is carried by the gas. The highest metal temperature at which corrosion is encountered is about 300 degrees Fahr. Corrosion of preheater tubes is aided by the erosive action of ash particles. The presence of a zone of high moisture, caused by a leak or by a steam soot blower, will produce corrosion by gas from almost any type of coal. Protective metallic coatings have not withstood the attack. Enameled tubes will withstand corrosion if mechanical difficulties in their use can be eliminated.

—STEEL, 6-4-31



INGOTS
BILLETS
RODS

Our many years of specialization in rolling Round, Square, Keystone, Rectangular and Flat Rods from the highest quality Carbon and Alloy Steels, assure you a constant source of supply for dependable material.



Washburn Wire Co.

Phillipsdale, R. I.

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Importance of Industrial Equipment Must Be Recognized by Bankers

THROUGH the efforts of practical economists, banking interests are being brought to realization that a statement of equipment condition is just as important in analyzing an industry as is a statement of financial condition. Bankers are, or should be, interested primarily in the future possibilities of an industry rather than in a history of its past, yet the financial statement, which essentially is a history, generally has been the determining factor in establishing credit relations.

In mass production, three conditions can exist; good work can be produced slowly and expensively on old or inferior machines, bad work can be turned out rapidly but not necessarily cheaply on old or inferior machines, and good work can be turned out rapidly and economically on new, high quality machines. This third condition is the only profitable one under the unrelenting pressure of modern market conditions.

Until about ten years ago, the physical wearing out process was the principal factor in wiping out the value of machine tools, design having been more or less static over a considerable number of years. Even under war-time pressure, inflated production of existing designs, rather than development of new designs, was the rule.

Accelerated Obsolescence

Since the end of the war, however, machine tool design has developed an increasing tempo and the past year has witnessed an unprecedented flood of new designs, many of which are almost revolutionary in character. This engineering activity continues unabated.

The significance of this from the economic point of view is that physical wear of industrial machinery now is becoming a minor factor, while obsolescence is becoming an increasingly important factor, in determining the profit making possibilities of a production plant. At the present rate of improvement in machine tools, it by no means is inconceivable that a plant tooled up efficiently five years ago on a profitable competitive product, and since maintained intact without turning a wheel, would today be wholly unprofitable to operate, even though a lively demand for the identical product should continue to exist.

This is a mythical case, but a comparable condition actually does exist today to some degree in every plant engaged in mass production. The only way to combat it is constantly to replace the obsolete equipment by improved equipment, just as living cells constantly replace dying cells in a healthy body.

Physical Facts for Financiers

Under these conditions, the successful industrial banker will insist upon periodic and rather frequent "physical examinations" of those plants in which he is interested, just as surely as the modern physician insists upon periodic physical examinations of those patients whose bodily health he undertakes to maintain.

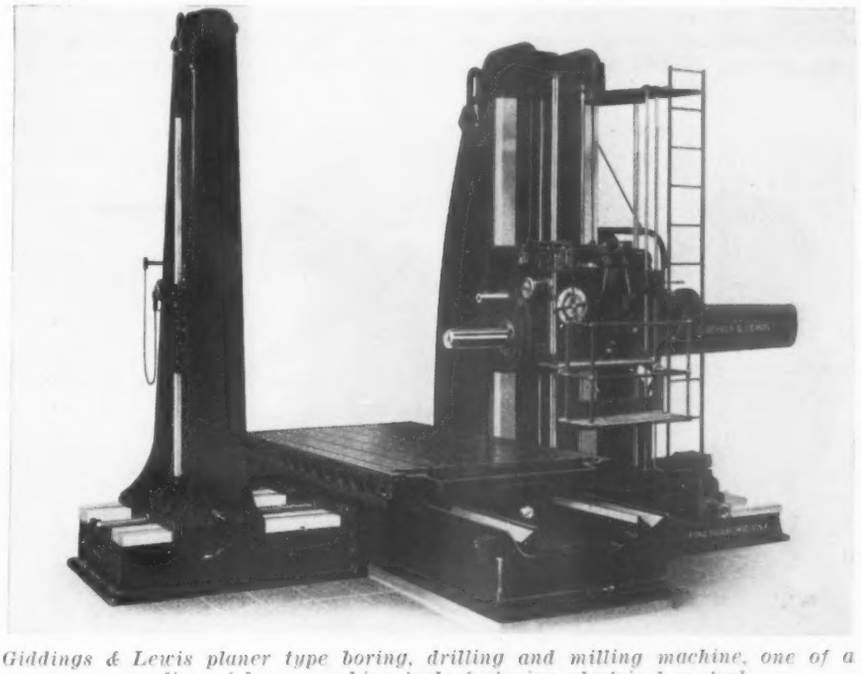
This type of banker will be successful with his industrial patients—not simply because of these physical examinations—but because he will be insistent upon, and actively will cooperate in, the indicated equipment replacement treatment necessary to continued economic health.

◆

Improved Boring Machines Have Electrical Control

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., announces an improved line of large machines for horizontal boring, drilling and milling, comprising table, planer and floor types. The accompanying illustration shows the planer type.

In addition to a 7-inch main spindle, there is a 4-inch auxiliary spindle, mounted above the main spindle within its backgear shaft. The main spindle has 36 speeds in geometrical progression, and the auxiliary spin-



Giddings & Lewis planer type boring, drilling and milling machine, one of a new line of large machine tools featuring electrical control

dle gives an additional 36 speeds over a range four times that of the main spindle. Together, the spindles cover a range from 3 to 720 revolutions per minute. Herringbone gears and combined radial and thrust ball spindle bearings insure smooth operation. Speed changes are controlled by two levers with position indicators.

A rotary lever with dial indicator gives nine feed changes, and through backgears a second set of nine feeds is available. Pickoff gears in the feed train give any desired positive lead and a handwheel provides slow hand feed to either spindle. Main spindle feeds range from 0.005 to 0.250-inch per revolution, while those of the auxiliary spindle range from 0.002 to 0.125-inch. Rate of rapid traverse to all units is 120 feet per minute.

Spindle Feed Mechanism

Feed is applied to the spindles through rack and pinion, loose teeth at each end of the rack limiting travel. An automatic depth gage can be set to throw out the feed at any point within 3-inch travel of the main spindle or within 6-inch travel in the case of the high speed auxiliary spindle.

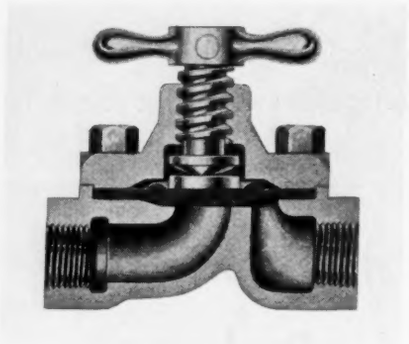
The main column houses the counterweight of the head, and is ribbed inside to insure rigid support, even when heavy milling is done in the extreme position. Adjustment of head up to 144 inches is possible. The column base contains starting, stopping and reversing clutches, a gear unit giving 18 milling feeds, and the rapid traverse mechanism. Direction of milling feed to each unit is controlled independently, and feed can be applied simultaneously in either direction, which is advantageous in profile milling.

A railed operating platform moves with the head, within convenient reach of which are grouped the manual and electrical controls. Electrical control, an important feature of these machines, is concentrated upon a small panel from which, through pushbuttons, the driving motor is started and stopped, the machine itself is started, stopped and reversed, feed and rapid traverse are applied, and clamping by torque motors is carried out. Colored lights on this panel indicate which units are clamped, also which parts of the machine are operating.

Design of Table

A heavy box table is used on both the planer and the table-type machines, its possible limit limit of size in the latter case being 72 x 144 inches. It has numerous reamed stop holes as well as full length T-slots. On both these machines the end support block moves in unison with the head, and in the case of the planer type, the head, column and column base all are movable along a runway at right angles to the table travel.

A 40-horsepower motor is required to drive these machines. Approximate net weight of the table-type machine is 115,000 pounds, of the planer-type 180,000 pounds and of the floor-type 150,000 pounds.



Westinghouse diaphragm stopcock for positive closure of air lines

Stop Cock for Air Lines Has Diaphragm Closure

Westinghouse Traction Brake Co., Wilmerding, Pa., has developed a new stop cock which is said to insure quick, positive closure on industrial air lines. The accompanying illustration shows this stop cock sectioned.

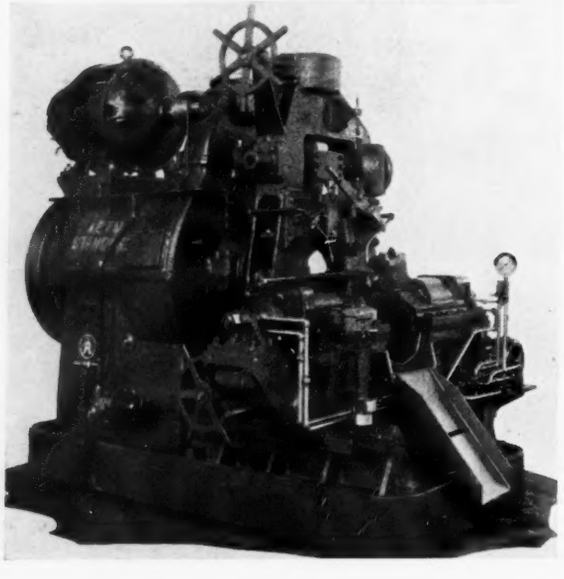
The distinctive feature is a flexible composition diaphragm which acts as a valve to open and close the passageway through the cock. This diaphragm is clamped between body and cap and has an annular rib designed to engage a seat on the body. When this diaphragm is in upper position the passageway through the cock is open. When the operating handle is turned clockwise, the threaded stem and its pressure plate forces the annular ring down on its seat. Slight pressure gives tight closure.

These cocks are furnished to fit ⅜, ½, ¾ and 1-inch pipe. The only upkeep involved is an occasional diaphragm replacement, which is a simple and inexpensive operation.

Tube Cutting Machine Has Air Operated Chuck

A tube cutting-off machine, in which many new features are incorporated, recently has been placed in operation by the Aetna-Standard Engineering Co., Youngstown, O. This machine handles tubes from 6⅝ to 16-inch outside diameter. A 5-jaw chuck, used to hold the tubes in the machine, is mounted on the entering end of the spindle instead of at the cutting tool end. To insure stability of the tube being cut a set or rounding-up blocks or clamps is placed just back of the cutting tools. Both the jaw-operating mechanism, which is of the lever and cam type and the rounding-up blocks are operated by air cylinders. Internal moving parts are lubricated by a spray oil system.

The cutting tools are mounted on their own carriage at the front of the machine. This carriage slides on machined steel ways being adjusted by a



Cutting-off machine developed by Aetna - Standard Engineering Co. to handle tubing ranging from 6⅝ to 16-inch outside diameter. Pneumatic chuck is at entering end of spindle, while pneumatic rounding-up mechanism is just back of cutting tools

. . . . . *This Book Belongs on Your Desk!*

We have recently compiled from our engineering data, a new catalog containing complete specifications and practical working data on Continuous-Tooth Herringbone Speed Reducers and Gears. • • • • • The information contained in this catalog will solve many power transmission and speed reduction problems confronting the Plant Engineer. These recommendations are based upon actual applications of Continuous-Tooth Herringbone Speed Reducers and Gears in the Various Industries. They make possible the selection of the most efficient gear ratio for each given operation as affects efficiency and power economy. • • • • • We believe this catalog to be the most complete reference on Herringbone Gear application available today. It is yours for the asking—and without obligation. *Mail the coupon for it today!*

D. O. JAMES MANUFACTURING CO.
All Types Speed Reducers and Gears
1120 W. MONROE STREET
CHICAGO, ILL.

Tom: Here's a book which has helped me a great deal —you ought to get a copy. You'll find it advantageous too. The James organization certainly knows what the shooting is all about.

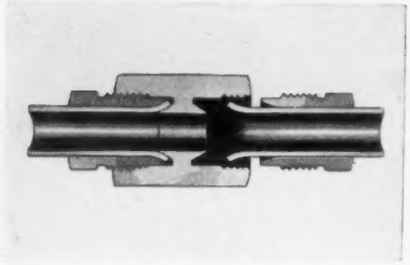
D. O. JAMES MANUFACTURING CO., 1120 W. Monroe St., Chicago.
SEND COPY OF CATALOG No. 136.

Name of Company .....

Name of Individual .....

Address .....

City ..... *State* .....



Compression coupling for service lines developed by Bailey Meter Co.

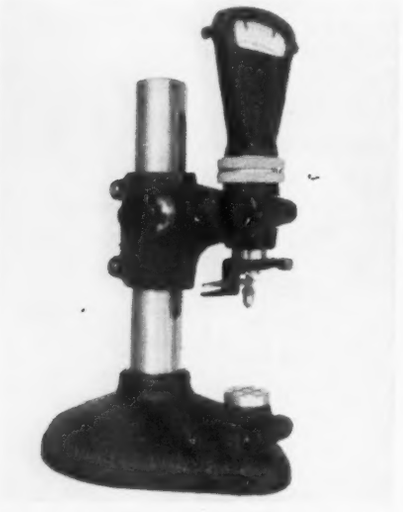
handwheel-operated rack and pinion. The tool holders themselves are moved to and away from the tube being cut by a variable-pressure hydraulic feed, the speed of which is made adjustable to meet various conditions. The hydraulic pump and its motor is mounted directly on the cutting tool carriage thus doing away with flexible tubing or sliding joints in oil lines from the pump to the oil cylinders which are enclosed in the tool holders.

The chips from the cutting tools are gathered in a reservoir under the cutting tool carriage. The cutting compound after passing through a series of strainers and after the removal of all chips and grit, is returned to the cutting tools by its own pump.

◆

Micro-Indicator Stand Is Precision Instrument

R. Y. Ferner Co., Investment building, Washington, is marketing a new micro-indicator stand made by Societe Genevoise d'Instruments de Physique, Geneva, Switzerland. One of these stands is shown in the accompanying illustration, together with a fan shaped micro-indicator having knife edge multiplication system.



Societe Genevoise micro-indicator stand announced by R. Y. Ferner Co.

The stand has a heavy base which rests on three rubber feet. An accurately bored socket at the front of the base provides interchangeable mounting for a number of different types of lower anvils or tables. The table shown in the illustration is 1⅝-inch diameter, hardened and lapped optically flat. It is cross grooved to make it easy to wring on a standard gage to attain zero setting.

The 2-inch diameter column has a rack for quick arm adjustment. Its pinion has an eccentric bearing for accurate adjustment in the rack, and the arm has a heavy clamp at the rear. It can be raised 6 inches and the stand will test cylindrical parts up to 6 inches in diameter.

Mounting of Indicator

The micro-indicator is mounted in the arm by an adjustment ring, by rotation of which fine settings on standard gages can be accomplished. The setting is locked by a clamp which precludes any vertical shift. Micro-indicators are available graduated to 0.0005, 0.0002, 0.0001, or 0.00005-inch per division, and carrying adjustable tolerance marks.

The oval base is approximately 10 inches long and 7½ inches wide. The instrument is 13¾ inches high and weighs 32 pounds.

◆

Compression Fittings Make Tight Joints in Tubing

Bailey Meter Co., 1050 Ivanhoe road, Cleveland, has developed a system of compression couplings and tubing for use on small service lines, particularly those carrying high pressures. The cut at top of this page shows one of these fittings and its flanged tubing in section, one side being screwed down tight, while the other is open to show the construction.

Brass, monel metal or steel couplings are available, and copper or steel tubing can be used. For pressures up to 800 pounds per inch, when temperatures are under 600 degrees Fahr., double extra heavy brass fittings and soft annealed or half hard copper tubing are recommended. Although copper tubing can be used satisfactorily under hydraulic pressures up to 2000 pounds per square inch, steel tubing should be used for steam pressure above 800 pounds per square inch.

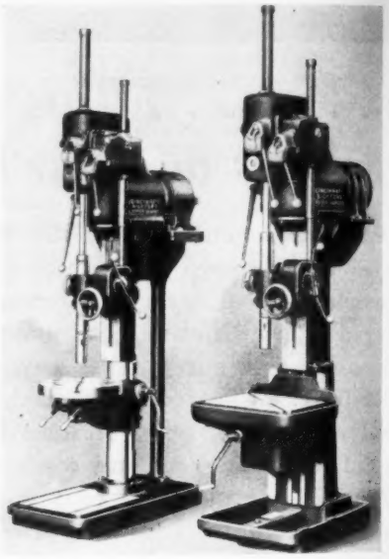
The nut serves as an effective die in completing the flaring of the tube, the moderate angle of flare precluding splitting or cracking even of hard drawn tube. Perfectly tight metal-to-metal joints can be made by an inexperienced workman, a hammer, flaring tool and wrenches being the only tools required.

◆

New Upright Drills Have Round or Box Columns

Cincinnati Bickford Tool Co., Oakley, Cincinnati, announces new types of 21 and 24-inch upright drilling machines in both round and box column design, as shown in the accompanying illustration. They may be equipped for efficient performance either on general purpose drilling, or single purpose production work.

The standard design has 12 spindle speeds, obtainable through selective sliding gears controlled by a single lever. Heat treated chrome-nickel steel gears are used, mounted on shafts having integral multiple keys. Ball and roller bearings are used liberally throughout and all moving parts are flooded with oil automatically.

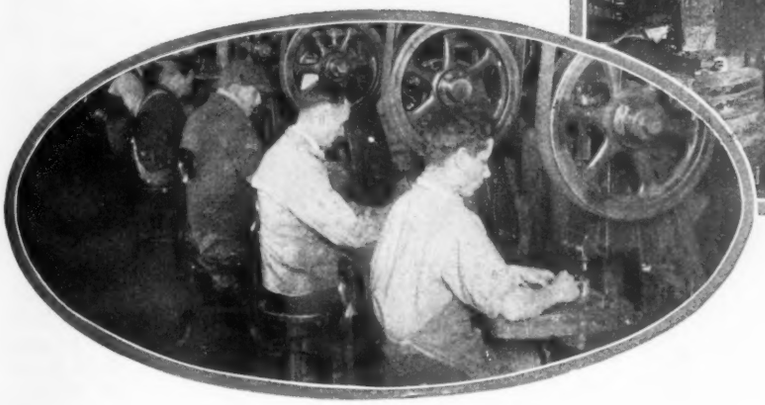


Round and box column upright drills built by Cincinnati Bickford Tool Co.

Direct reading plates indicate the 12 spindle speeds, as well as 9 rates of feed, which also are controlled by a single convenient lever. The feed changes are obtained through selective heat treated alloy steel sliding gears with broached integral keys.

The fully inclosed sliding head is accurately counterbalanced. Feed engagement is by a constant mesh worm running in an oil bath. Either of two pilot levers controls the advance and return of the spindle,

Bliss helps solve your stamping problems



IN many cases Bliss engineers have found a simple, economical and speedy method of performing operations that had previously been considered unavoidably laborious and costly.

Whether your sheet metal operations involve blanking, drawing, punching, piercing, stamping, or embossing light or heavy gauge parts in any size or shape, the extensive experience of the Bliss engineers can be of real help to you.

Even though your particular problem may be unique, at least some of its phases have already been solved by Bliss equipment of various types, and the Bliss recommendations have behind them the authority of 70 years of experience and highly successful designs.

BLISS

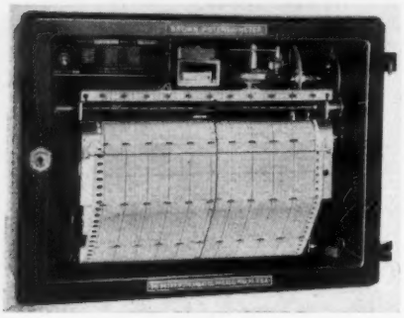
E. W. BLISS CO. MAIN OFFICE AND WORKS **BROOKLYN, N. Y., U. S. A.**

Sales Offices

DETROIT Gen. Motors Bldg. | CLEVELAND Guarantee Title Bldg. | CHICAGO 1900 N. Kilbourn Ave. | CINCINNATI Union Trust Bldg. | ROCHESTER Times Union Bldg. | NEW HAVEN 2d Nat. Bk. Bldg. | BOSTON Weld Bldg. | PHILADELPHIA Nat. Bk. of N. Phila. Bldg.

American Factories: BROOKLYN, N. Y. HASTINGS, MICH. SALEM, OHIO

No. 561



Potentiameter pyrometer developed by Brown Instrument Co.

sidewise movement of the lever engaging a positive feed clutch. An adjustable trip can be set to disengage the feed at a predetermined depth. Safety trips automatically disengage the feed at the top and bottom limits of travel.

Driving clutches are of unit design, completely assembled on a self-contained drum housing. They are mounted on large ball bearings and are flooded automatically with oil. Forward and reverse clutches are actuated through internal expanding rings of heat treated bronze, fitted into hardened steel cups integral with the driving bevel gears. Driving clutches operate at constant speed, insuring maximum power at all spindle speeds.

Operating Convenience

In the case of the round column machine, the table arm, as well as the table, is clamped from the front. Drive is direct from a motor of 3 or 5 horsepower, the close coupled mounting of which locates it out of the operator's way and in a position where chips and dirt cannot cause damage.

These new machines may be had as single units or combined as gang drills either of high-base or low-base type.

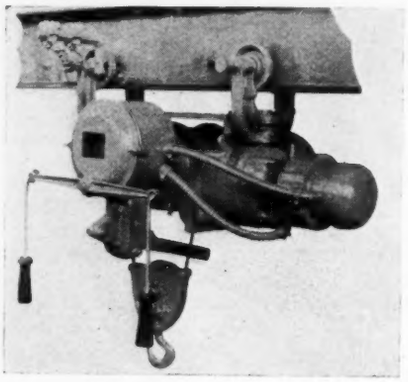
◆

Roll-Type Former Produces Special Retaining Strip

Kane & Roach Inc., Syracuse, N. Y., recently has completed a cold forming machine for the production of steel retainer strip for gypsum board. This machine is shown in the accompanying illustration together with strips before and after processing.

The main frame will accommodate 11 stands, but in this case only nine are required. Details include ½-inch shafts and 4⅛-inch diameter rolls on 8-inch horizontal centers, with roll space on the shafts of 6 inches. Quick removable outer bearings are mounted on the guide support platform. To insure uniform width of the scalloped edge of the strip, blank stock must be held within close width limits, without camber, this necessitating micrometer adjustment of starting guides to align stock correctly with the first set of rolls.

Shearing and forming of the scalloped edge of the strips are done simultaneously in the ninth set by the use of an intricately built up roll embodying forming and shearing means and designed to allow for grinding on faces and easy replacement in proper position. A trial run on 50,000 feet of stock failed to dull the cutters and even by the end of this run no signs of ragged edges had appeared on the work.



Sprague electric hoist which features compact, weatherproof mechanism

◆

Small Electric Hoists Are Compact in Design

Sprague Electric Hoist division, Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., announces a new, compact electric hoist design. Two sizes are available, one of ¼-ton and the other of ½-ton capacity. One of these hoists, with trolleys in operating position on its I-beam, is shown in the accompanying illustration.

These hoists are equipped with ball bearing motors manifactured by the General Electric Co. Wiring is entirely in conduit, and control may be by pendant rope, as illustrated, or by pendant push button. On account of complete mechanical and electrical inclosure, the hoist is suitable for operation outdoors, exposed to the weather, as well as for operation indoors.

A simple form of worm drive adds to compactness and low head room. The trolley is of swivel type, with ball bearing wheels, and is designed so that it runs easily around turns of short radius.

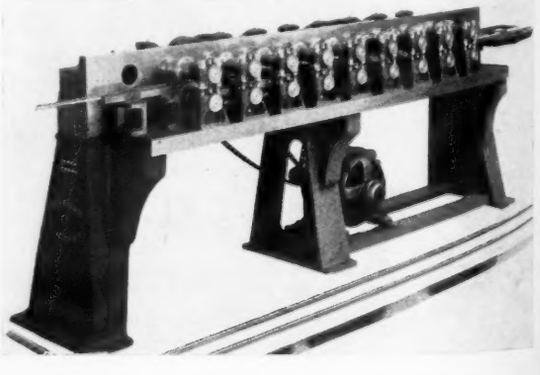
◆

Potentiometer Pyrometers Control Heat Treating

Brown Instrument Co., Philadelphia, announces a new line of potentiometer pyrometers built in indicating, recording, multiple recording and controlling types. These instruments are recommended for use in connection with heat treatment of steel, brass and alloy parts and in control of electrical furnaces. The accompanying illustration shows one of these instruments with recording chart in position.

The galvanometer mechanism has uniformly high response under all practical operating conditions. The balancing mechanism exerts no strain upon the galvanometer pointer and mechanical movement of the secondary pointer is comparatively large. As a result, no adjustments are needed to take up wear on either the pointer or contacting mechanism.

Charts and scales are 12 inches wide and conform to the latest standard calibration. A humidity compensator built into the instrument automatically adjusts the pen.



Special roll stand setup worked out by Kane & Roach Inc. for rapid forming and scalloping of metal retainer strip used with gypsum board

Iron Rate Off; Pipe Awards Heavy

Structural Requirements Continue Large, as Automotive Demands Taper — Operations Slightly Under 41 Per Cent — Price Composite Shows Sharper Reduction

AFTER rising for four consecutive months the daily rate of pig iron production turned down in May, output averaging 64,355 gross tons, compared with 66,986 tons in April and 104,564 tons in May, 1930.

The monthly total in May—1,995,000 tons—compares with 3,241,477 tons in May last year. For the first five months this year production stands at 9,460,125 tons, down 38.5 per cent from 15,370,106 tons in the like period of 1930.

During May five stacks were blown in and 13 were blown out, the net change being a decrease of eight. As of May 31, therefore, 105 stacks were active, compared with 113 April 30 and 116 March 31.

The decline in the daily rate of pig iron production foreshadows a decrease in the output of steel ingots for May, to be disclosed next week. This week the steelworks operating rate for the entire country is down fractionally to just above 40 per cent, within a few points of what some steel executives forecast will be the low for the summer.

As in a majority of weeks thus far in 1931, structural requirements are outstandingly large. Bids will be taken, for example, on June 15 for 30,000 tons for a bridge at Henderson, Ky.; on June 17 for 103,000 tons for the Golden Gate bridge at San Francisco, and early in August for 22,500 tons of structural steel and 3500 tons of reinforcing bars for the Union Inland Terminal for the port of New York authority.

The treasury department architect at Washington has plans under way for 50 federal structures, of which eight or ten should be placed in June. Reflecting the influence of government stimulus in public work, demand for sheet piling is unusually brisk. Four Milwaukee fabricators have offered to provide 6500 tons of steel for a local viaduct at cost to provide work. This week structural awards at 26,684 tons compared with 34,106 tons a week ago, and exceed the 21,285 tons in the corresponding week of 1930.

Steel pipe demand is more active, awards for the week amounting to 72,500 tons, including 40,000 tons for the Hetch Hetchy project, San Francisco, placed with the Western Pipe & Steel Co. The Humble Pipe Line Co. awarded 9000 tons to the National Tube Co., Pittsburgh, and the Magnolia Pipe Line Co., 10,000 tons to the A. O. Smith Corp. Sixty-five hundred tons was placed by the Memphis Natural Gas Co. with Republic Steel Corp. Three thousand tons for the Phoenix Utility Co., and 4000 tons for the Pennsylvania railroad station, Philadelphia, were divided among several sellers.

Probability that the May output of passenger cars and trucks in the United States approximated the 335,708 produced in April fails to overcome the feeling of pessimism at Detroit concerning a recession in June.

For the 150 electric locomotives ordered by the Pennsylvania railroad comparatively little rolled steel will be required. The Lackawanna railroad has purchased 13,000 tons of rails.

Neither producers nor consumers display noteworthy interest in third quarter requirements, and except for bolts, nuts and rivets, on which second quarter prices have been extended, there has been no determination of prices for that period. Because pig tin is lower there is some expectation that the tin plate price for the last half of the year will be reduced.

While strictly valley producers of basic iron stand upon $17 as their market, the willingness of steelworks in nearby districts to accept less to move surplus is having a weakening effect on pig iron in those districts. By-product foundry coke has been reduced 25 to 50 cents a ton in the East. Purchases by a Gary producer appear to have stabilized heavy melting steel at $9 at Chicago.

Reinforcing billet bars are down $1 a ton at Chicago. One moderate size consumer of steel is reported to be replenishing stocks, believing current levels about represent the bottom, but this movement is not general.

Due to the softness in basic iron at Pittsburgh, in black sheets, wire and semifinished steel, STEEL's composite is down 30 cents to $31.03.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (June 3, 1931)	**$31.03**
Last week (May 27, 1931)	**31.33**
One month ago (May, 1931)	**31.37**
Three months ago (March, 1931)	**31.66**
One year ago (June, 1930)	**33.53**
Ten years ago (June, 1921)	**41.87**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	June 3, 1931	May 1931	March 1931	June 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.26	18.26	20.76
Basic, valley	17.00	17.00	16.75	18.50
Basic, eastern del. eastern Pa.	17.00	17.00	17.31	18.75
No. 2 foundry, del. Pittsburgh	18.26	18.26	18.01	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	18.40
*Southern No. 2, Birmingham	12.00	12.00	13.00	14.00
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	17.75	17.76	18.26	20.26
Malleable, valley	17.00	17.00	17.00	19.00
Malleable, Chicago	17.50	17.50	17.50	18.40
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	17.38	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.40	2.45	2.50	2.50
Connellsville foundry, ovens	3.25	3.25	3.25	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	29.00	29.75	30.00	31.25
Sheet bars, open-hearth, Pitts.	29.00	29.75	30.00	31.25
Billets, open-hearth, Pittsburgh	29.00	30.00	30.00	31.25
Wire rods, Pittsburgh	35.00	35.00	36.00	36.00

	June 3, 1931	May 1931	March 1931	June 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.65	1.75
Steel bars, Chicago	1.75	1.75	1.70	1.85
Steel bars, Philadelphia	1.94	1.94	1.94	2.04
Iron bars, Chicago	1.80	1.80	1.70	1.90
Shapes, Pittsburgh	1.65	1.65	1.60	1.70
Shapes, Philadelphia	1.76	1.76	1.81	1.66
Shapes, Chicago	1.75	1.75	1.70	1.80
Tank plates, Pittsburgh	1.65	1.65	1.65	1.70
Tank plates, Philadelphia	1.85½	1.85½	1.80½	1.85½
Tank plates, Chicago	1.75	1.75	1.70	1.80
Sheets, blue anl., No. 13, Pitts.	2.00	2.00	2.05	2.15
Sheets, black, No. 24, Pitts.	2.15	2.25	2.35	2.55
Sheets, gal., No. 24, Pittsburgh	2.80	2.80	2.90	3.20
Sheets, black, No. 24, Chicago	2.40	2.40	2.50	2.70
Sheets, blue anl., No. 13, Chicago	2.15	2.15	2.20	2.30
Sheets, galvanized, No. 24, Chi.	2.95	2.95	3.05	3.35
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Wire nails, Pittsburgh	1.80	1.90	1.90	2.15
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	10.75	11.25	12.90	15.10
Heavy melting steel, eastern Pa.	9.00	9.50	10.50	13.28
Heavy melting steel, Chicago	8.50	8.65	9.75	12.05
No. 1 wrought, eastern Pa.	10.00	11.00	11.00	14.25
No. 1 wrought, Chicago	8.25	8.40	9.00	11.50
Rails for rolling, Chicago	11.00	11.15	12.00	14.55

Sheets

Market Continues Quiet—Some Valley Mills on 6-Hour Shifts Obtaining Larger Output

SHEET PRICES, PAGE 75

Pittsburgh—Sheet business is slow and little changed. May showed a small decline in demands of most consumers from the April rate. Operations are fairly steady at moderately below 40 per cent. Consumers are showing little interest in future requirements, few inquiries appearing for third quarter. Producers are quoting prices announced in connection with the new classifications for that period and on business for shipment over the remainder of this month are naming old prices. The market generally is 2.15c for black sheets, 2.80c for galvanized, 2.00c for No. 13 gage blue annealed, 1.85c for Nos. 9 and 10 gage and 3.00c to 3.10c for autobody.

New York—Although most sellers of sheets have indicated higher prices for third quarter, consumers have shown little disposition to lay in stocks. Current prices are largely unchanged, although black sheets appear stronger, with fewer sellers shading 2.25c, Pittsburgh. A price of 2.15c still can be done on attractive business, however, particularly for the larger jobbers. Blue annealed plates are 1.80c to 1.85c, Pittsburgh, and blue annealed sheets, 1.95c to 2.00c, Pittsburgh.

Philadelphia—Pending the time when the new sheet classifications and prices will be tested, the market generally is unchanged. Galvanized are 2.75c to 2.80c, base, Pittsburgh, to the general trade, with 1.70c to some jobbers. Black sheets usually are 2.25c, although 2.15c has not disappeared. The Pennsylvania railroad has placed 1200 tons of black sheets.

Youngstown, O.—Further dropping in operating rates of independent sheetmakers in this district is due to the financial difficulties of an important producing interest with steelworks at Mansfield, O., but which has supplemented its supply from local mills. Automotive interests continue to specify autobody sheets in limited lots, two of these interests continuing as active buyers. Common black and galvanized are in moderate demand. The Mahoning Valley Steel Co. has put its workmen on four 6-hour shifts, as did the Republic Steel Corp. recently, this resulting in a spreading of the working hours among a greater number of workmen and also producing a greater hourly tonnage output per mill. Quotations for all grades of sheets are unchanged.

Cleveland—Some sales of autobody sheets again were made during the week at 3.10c, Pittsburgh, though certain mills went to 3.00c on prompt tonnage. Specifications for the Fisher Body plant here continue to be issued from Detroit, with daily assemblies of about 5000 jobs. Electric refrigerator companies take large tonnages. Most other lines are slow. Some makers will continue to ship on the old price basis until June 30; others will stop June 15. Practically all makers are in line with the new classifications for third quarter. One inquiry is curent for 2500 tons of barrel stock for third and fourth quarters, and so far the minimum price developed is 2.40c, in accordance with the new list.

Cincinnati — Sheetmakers, with production schedules at slightly better than 50 per cent, say black sheets are held at 2.25c, base, Pittsburgh. New orders are somewhat heavier and more diversified.

Chicago—Sheet orders this week are about the lowest this year. One producer was able to start only one of its 18 Indiana Harbor mills at the beginning of the week, but scheduled additional turns, bringing the rate to a little less than 40 per cent. Mills are holding to a minimum of 2.35c for No. 24 black sheets, despite relatively lower prices in the East. Orders for road strip are disappointing despite the large amount of highway surfacing. No further demand for galvanized roofing sheets is expected before about Aug. 1.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh, base	2.15c to 2.25c
Philadelphia, delivered	2.44c to 2.54c
Gary, Indiana Harbor	2.35c
Chicago, delivered	2.40c
Birmingham, base	2.40c
St. Louis, del.	2.60½c

TIN MILL BLACK, No. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.75c to 2.80c
Philadelphia, delivered	3.04c to 3.09c
Chicago, delivered	2.95c
Gary, Indiana Harbor	2.90c
Birmingham, base	2.95c to 3.05c
St. Louis, del.	3.15½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.00c
Chicago, district mills	2.10c
Chicago, delivered	2.15c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.29c
Birmingham	2.15c to 2.20c

BLUE ANNEALED No. 9-10

Pittsburgh, base	1.85c
Chicago, district mills	1.95c
Chicago, delivered	2.00c
Philadelphia, delivered	2.14c
St. Louis, delivered	2.25½c
Birmingham	2.00c to 2.05c

AUTOMOBILE NO. 20

Pittsburgh, base	3.00c to 3.10c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.50c

New Classifications, Pitts. base:

Heavy cold-rolled No. 10, 2.35c; cold-rolled No. 20, 2.95c; heavy furniture No. 10, 2.75c; light furniture No. 20, 3.35c; furniture No. 24, including patent leveling, 3.50c. Hot-rolled No. 10, 1.70c; hot-rolled No. 24, 2.40c to 2.50c. Differentials of 10 and 15 cents, respectively, apply at Gary, Ind., and Chicago, delivered.

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00
Gary, Ind., base 10 cents higher.	
Long ternes, 24, unassorted, lb.	3.15c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.80-1.90, and 1.90
Cement coated nails	1.80-1.90, and 1.90
Galvanized nails	3.80-3.90, and 3.90

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c
Spring wire	3.20c

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l., Chicago	2.85c
7/16-in. smaller, Pitts.	70, 10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

Steel Plates

Base, Pittsburgh	1.65c
Philadelphia, del.	1.85½c
New York, delivered	1.93c
Boston, delivered	2.05c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.80c to 1.85c
Coatesville, Pa., base	1.75c
Pacific Coast, c.i.f.	2.00c to 2.05c
St. Louis, del.	1.95½c

Structural Shapes

Base, Pittsburgh	1.65c
Philadelphia, del.	1.76c
New York, del.	1.85½c to 1.90½c
Boston, del.	1.98½c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham base	1.80c to 1.85c
Pacific Coast, c.i.f.	2.05c to 2.15c

Bars

SOFT STEEL

Base, Pittsburgh	1.60c to 1.65c
Chicago, base	1.70c to 1.80c
Birmingham base	1.80c to 1.85c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.15c
Cleveland, base, local del.	1.70c
Cleveland base, out. del.	1.85c
Philadelphia, del.	1.94c
New York, del.	1.98c
Boston, del.	2.05c
Pittsburgh, cold finish	1.85c
Pittsburgh, forg. qual.	1.90c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.50c to 1.55c
Pittsburgh	1.30c to 1.35c

IRON

Chicago, base	1.70c to 1.80c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c
Stock lengths, mill	1.60c to 1.65c
Chi., billet	1.85c to 2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bars, 2.65c, mill

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10 Cr.	0.45
2300	1.50	51.00 Cr. spring	0.20
2500	2.25	6100 bars	1.20
3100	0.55	6100 Spring	0.95
3200	1.35	Cr., Ni., Van.	1.50
3300	3.80	Carbon Van.	0.95
3400	3.80	9250 (flats)	0.25
4100 .15 to .25 Mo.	0.50	9250 (rds.,sq.)	0.50
4600 .20 to .30 Mo.			

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.60c to 1.65c
Hot strip 6 1/16 to 24-in. Pitts.	1.50c to 1.60c
Hot strip, bands 6 in. and Under, Chicago	1.70c to 1.75c
Do. 6 1/16 to 24 in.	1.60c to 1.70c
Cooperage hoop, Pitts.	1.70c to 1.80c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.15c to 2.25c
Worcester, 3 tons, over	2.40c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 20 to 45 lbs.	$22.00 to $26.00
50 to 75	20.00 to 24.00
80 to 100	24.00 to 27.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.70c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.70c
Spikes boat, barge, Pitts.	2.90c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off
Tire bolts, 60, 10 and 10 off.
Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off
Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off
Upset 1 in. and smaller ..... 80-10-5 off
Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh do, less carloads, 5 kegs or over, 2.65c to 2.75c;	2.40c to 2.50c
and less than 5 kegs	2.80c to 2.90c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Chicago Mills Find Bars Lead Finished Steel Items—Third Quarter Prices Not Named

BAR PRICES, PAGE 75

Chicago — Late-month specifications for bars and other finished steel products brought shipping orders above the average of the last six weeks. Bar mills are leading finishing departments at about 50 per cent. Inquiries are more active but are seldom for forward obligations except in extended specific work. Prices named in answer to inquiries are on the basis of 1.70c, Chicago. While few buyers want to obligate themselves, shipments on some contemplated work would extend into third quarter. Third quarter prices are not being announced. Partsmakers are expected to taper steadily this month, but so far schedules are virtually unchanged. Deformed bars for public building, bridge and road work are more of a factor in shipments. Alloy bar mills remain at 45 to 50 per cent.

New York—Steel bars are moving at 1.65c, Pittsburgh, subject to occasional shading. Business is quiet.

Pittsburgh—New business in steel bars continues light and prices are receiving a test only on small lots. The market has been fairly steady recently on such orders at 1.65c, Pittsburgh. Producers have made no announcement regarding third quarter quotations but it is expected there will be no change from the current market. The 1.70c price announced for spot business for this quarter has found little application. Specifications show little change although May business was off moderately from April.

Youngstown, O.—Little improvement appears in demand for steel bars, with railroad shops and agricultural implement makers taking only minimum quantities in occasional purchases. Alloy steel bar demand from auto partsmakers continues to maintain a fair rate of operation. Common steel bars are quoted at 1.65c, Pittsburgh.

Cleveland—Demand for soft steel bars shows little variation from the beginning of May. Automobile requirements for June indicate a moderate decline. Bolt, nut and rivet makers take bars at an unchanged rate. For local delivery the market continues generally unchanged at 1.70c, Cleveland; for outside, 1.65c is done.

M. H. Treadwell Co. of Illinois, Chicago, has booked eight hot metal cars, 160 tons capacity each, for the Gary plant of the Illinois Steel Co. This equipment is for use in connection with the open-hearth furnaces at Gary.

Cold Finished Prices, Page 75

Cleveland—While new sales of cold-finished bars at 2.10c, Cleveland, are for small amounts in harmony with consumer needs, makers appear to be firm on that level. Some have some 2.00c unexpired contracts they continue to work off. Most of the present business is automotive in character though miscellaneous consuming lines are represented in the lineup.

Pittsburgh—Activity in cold-finished steel bars shows an additional decline as a result of curtailed automotive operations. Demand from other users also is off from the rate of recent weeks and new business is light. Producers defer announcement of a third quarter price with the market continuing 2.10c, Pittsburgh.

Drawn Steel Tubing Bought

Frankford, Pa.—Pittsburgh Steel Products Co. has been awarded 8300 feet of drawn steel tubing for the arsenal here, on a bid of 13.2c.

Plates

Large Western Tank Projects Still in Abeyance—Spot Inquiries More Numerous

PLATE PRICES, PAGE 75

Chicago—Tank plate inquiry from the oil fields remains disappointing, although prorating policies by the middle of this month may determine whether the expected East Texas tank business will develop. Plate prices are based on 1.70c, Chicago. Forward inquiry is no factor in plates, although spot inquiries have been more numerous, largely in building and bridge work. Railroad shops submit only light specifications for car repairs, despite increased employment in several western shops. Plate mills are operating about 45 per cent.

New York—Plate prices continue 1.75c, Coatesville, Pa., for material in carload lots. Demand is slack, with action slow on the few tonnages being figured. Some plates are required for a dredge for United States engineers, on which the Ellicott Machinery Corp., Baltimore, is low with a bid of $240,850.

Philadelphia—Plate prices are unchanged at 1.75c, base, Coatesville, Pa., for carloads, and present indications point to makers reaffirming this figure for third quarter. The number of orders is holding up, but tonnage is lighter.

Pittsburgh—Plate business is fairly steady, sustained by a fair demand for river equipment and miscellaneous requirements. Specifications from freight car builders continue poor while requirements of line pipe producers remain rather slow. Island Creek Coal Co. has placed ten barges, requiring 1600 tons of plates and shapes. Several other substantial inquiries for barges remain pending. Plates continue 1.65c, Pittsburgh.

Washington—The navy is drawing plans for 11 torpedo boats which will require an aggregate of 8000 to 9000 tons of steel, chiefly plates.

Cleveland—Day-to-day needs of machine shops, tank builders, and other miscellaneous plate fabricators constitute the plate market. The city is understood to contemplate erection of another large tank. Road roller and steam shovel manufacturers occasionally buy small lots. Plates are held at 1.65c, base, Pittsburgh.

Contracts Placed

1600 tons, plates and shapes, 10 coal barges for Island Creek Coal Co., to McClintic-Marshall Corp., Bethlehem, Pa.

450 tons, 5000 feet of 36-inch welded pipe for St. Louis, to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, tanks for Ford Motor Co., assembly plant, Seattle, to Puget Sound Machinery Depot, Seattle.

Contracts Pending

1126 tons, armor, bureau of ordnance, navy department, Washington; bids June 22.

Unstated tonnage, 50-foot steel hull motor-driven tug; bids June 23, United States engineer, New York.

Railroads

Pennsylvania Awards Equipment for 150 Electric Locomotives—Car, Rail Demand Low

TRACK MATERIAL PRICES, PAGE 75

Philadelphia—In connection with its electrification program, Pennsylvania railroad placed electrical equipment for 150 electric passenger and freight locomotives, 90 with Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., to cost in excess of $9,000,000, and 60 with General Electric Co., Erie, Pa., to cost in excess of $6,000,000. Pennsylvania railroad also plans to purchase 80 electric locomotives of other types later, the electrical equipment probably to be furnished by American Brown Boveri Electric Corp. Of the 150 locomotives ordered, 90 are for fast through-passenger trains, and 60 for high speed freight service between New York and Washington.

Apart from wheels, axles and special castings little steel is involved in the entire 230 locomotives.

Pennsylvania will build 3250 containers for less-carload freight shipment at its own shops at Altoona, Pitcairn and Enola, Pa.

Pittsburgh—Orders from railroads involve only small lots. May business was off slightly from April. The near future outlook remains uncertain due to the depleted stocks. Pennsylvania railroad has placed about 1200 tons of black sheets for 3250 less—carload containers.

Cleveland — Railroads continue slow with releases against rail and track material orders on makers' books. No new demands are arising. Erie railroad has been purchasing bridge steel for work in New York state at Port Jervis and Big Tree. Car and locomotive orders are absent so far as this district's carriers are concerned.

Chicago—About 4000 tons of finished steel will be ordered shortly for the 500 Northern Pacific box car underframes and superstructures. Underframes were awarded a western car shop. Railroad shops are restricting repairs to a starvation basis, although a few shops are increasing employment this month. Several small miscellaneous rail orders have been closed. Releases for track fastenings maintain the recent higher averages, although sales are only about 1000 tons weekly. No fresh rail inquiries are out, but specifications are maintaining about 40 per cent rail mill operations. Eight western railroads have not placed primary rail orders. These include Rock Island, St. Paul, Illinois Central, Chicago & Eastern Illinois, Monon and several other lines. It is probable present rail production will continue through this month.

New York—Preliminary estimates are that less than 100 freight cars were placed in May.

Bethlehem Steel Corp. contemplates suspending operations at its Steelton, Pa., rail mill.

Car Orders Placed

Northern Pacific, 500 box car underframes and superstructure parts, to American Car & Foundry Co., Chicago.

Pennsylvania railroad, 3250 steel containers for handling less than carload freight, to own shops at Enola, Pitcairn and Altoona, Pa.

Locomotives Placed

Pennsylvania: Electrical equipment for 150 electric passenger and freight locomotives, to Westinghouse Electric & Mfg. Co. and General Electric Co.; contracts for the construction and assembling of these locomotives to be awarded shortly; electrical equipment for an additional 80 electric locomotives may be placed later, with at least a portion going to the American Brown Boveri Electrical Corp., the railroad has announced.

Rail Orders Placed

Lehigh Valley railroad, 13,000 tons rails to Bethlehem Steel Co., Lackawanna, N. Y.; shipment deferred on 10,000 tons.

Seattle Street Railway Co., Seattle, 580 tons, 70-pound relaying rail and tie plates, to Hoflus Steel & Equipment Co. Seattle.

Car Orders Pending

Chicago department of public works, 400 cast steel tunnel cars, 2-yard capacity.

Navy department, bureau of supplies and accounts, two to six helium tank cars, bids June 10.

Semifinished Demand Light and Prices Unsteady

Semifinished Prices, Page 86

Pittsburgh—Shipments of semifinished steel continue to decline slowly. Requirements of finishing mills are smaller than a month ago and orders are for only small lots. Prices are slightly unsteady with producers continuing to name $30 as the nominal market for billets, sheet bars and slabs. More orders recently, however, have gone at $29. Forging billets are $35 to $36 and wire rods $35.

Youngstown, O. — Independent sheet mill operations in this district continue to slow down and the movement of sheet bars from integrated mills has been checked correspondingly. Billet sales are small and infrequent, while slabs are the slowest moving of any semifinished commodity here. Sheet bars bring $29 to $30, Youngstown and Pittsburgh, while billets and slabs hold at $30, same bases.

Cleveland—Consumers of sheet bars, billets and slabs continue to order for early requirements, and no contracts have been placed or renewed for third quarter. Sheet bars are $29 to $30, and billets and slabs, $30, base, Cleveland and Youngstown.

Domestic Manganese Ore Shipments Higher in 1930

Production and shipments of domestic manganese ore increased in 1930, but the total value was lower than in 1929, according to the bureau of mines, Washington. Shipments of the ore containing 35 per cent or more of manganese amounted to 67,035 long tons last year, compared with 60,379 tons in the year preceding. The total value in 1930 was $1,437,465, and in 1929, $1,612,357.

Shipments of domestic ore containing 10 to 35 per cent of manganese declined from 78,191 tons in 1929 to 77,417 tons in 1930. The amount of ore containing 5 to 10 per cent of manganese dropped from 1,110,067 tons to 707,973 tons. Manganese ore was shipped from 11 states last year, Georgia and Montana supplying 81 per cent of the total, while Minnesota shipped the bulk of the lower grade, or manganiferous ore.

Imports in 1930 amounted to 585,568 tons, conaining 278,070 tons of manganese, and valued at $6,476,802, compared with 664,269 tons of ore, containing 323,415 tons of manganese, valued at $8,450,818 tons in 1929. Thirty-nine per cent of the imports last year came from Russia, 32 per cent from Brazil, 16 per cent from the Gold coast, and 10 per cent from India.

Manganese Ore Due

New York—Two cargoes of manganese ore for the Electro Metallurgical Corp. are expected to arrive in this country shortly. The Greek steamer CHELATROS, bound from Takorambi, West Africa, is due at Norfolk or Newport News this week, with 6500 tons. The ATLANTICOS, with 9500 tons, is due later. The ore is for the company's plant in Virginia.

Structural Shapes

Award Total 26,000 Tons, Comprises Jobs Mostly in 100 to 1000-Ton Range—Bridge Work Lettings Important — Also Inquiries—22,500-Ton Terminal Soon

STRUCTURAL SHAPE PRICES, PAGE 75

Chicago—Structural mills have the most promising immediate schedules, with continued inquiries and orders for public building and bridge work. More inquiries are out for structural prices than in other finished steel. Prices named are based on 1.70c, Chicago, but little of current inquiry extends into third quarter. It is indicated that 1.70c has been named for specific work covering part or all of the third period, although books are not open. Illinois highway commission is awarding general contracts for ten bridges, including 2400 tons. Bids on the Louisiana highway projects, 6000 tons, will be received June 30.

Boston—Of total awards, 900 tons, a theater at Boston awarded Palmer Steel Co. takes 500 tons. State bridges in Maine and Vermont will require 160 and 100 tons, respectively.

New York—Structural steel lettings continue to decline . Small jobs are fairly numerous. Bridges are prominent in contracts of the week. Fabricated steel prices continue to sag. Plain material is easy at 1.65c, Pittsburgh.

New York Structural Steel Board of Trade reports lettings for April totaling 15,155 tons against 159,044 in March. The latter figure included the Radio City award which may exceed 125,000 tons. April awards last year were 26,726 tons. Totals are exclusive of engineering projects, bridges, subways, etc.

Philadelphia—Structural tonnage has taken a slight spurt. Eight of the larger jobs total approximately 4000 tons. Shapes are unchanged 1.76c, Philadelphia.

Washington—The treasury architect is drawing plans for 50 government buildings, of which eight or ten will be let in June.

Pittsburgh — Shape business is made up mostly of small lots. The market provides little test of prices. Plain shapes generally are quoted 1.65c, Pittsburgh. Inquiry is quiet.

Cleveland—While general contract on the plant for Addressograph-Multigraph Corp., 1800 to 2165 tons, depending upon what design ultimately is decided upon, went to H. K. Ferguson Co., the steel tonnage will probably not be purchased for two weeks. Furnace bindings for Otis Steel Co., here, 156 tons, went to McClintic-Marshall Corp., while the 618-ton tuberculosis sanitarium, Cleveland, went to Ingalls Iron Works Co.

Contracts Placed

1370 tons, I-beam bridge spans for Missouri Pacific railway, to American Bridge Co., St. Louis.

1260 tons, Queens anchorage, Triboro bridge, New York, to American Bridge Co., Pittsburgh; Arthur McMullen Co., general contractor.

1190 tons, Humboldt Park station, Chicago, to American Bridge Co., Pittsburgh.

900 tons, power plant addition, Public Service Corp. of New Jersey, Burlington, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

850 tons, high school, Yonkers, N. Y., to unstated interest.

835 tons, office building, Syracuse Lighting Co., Syracuse, N. Y., to Lackawanna Steel Construction Corp., Buffalo.

800 tons, two apartments, Tulpehocken Construction Co., Germantown, Pa., reported placed with Max Corchin, Philadelphia.

800 tons, chapel, Girard college, Philadelphia, to Belmont Iron Works, Philadelphia.

760 tons, five 150-foot spans for interstate bridge at La Crosse, Wis., to Wausau Iron Works, Wausau, Wis., on its bid of $123,806.76.

750 tons, Principia college, North Alton, Ill., to Mississippi Valley Structural Steel Co., St. Louis; 550 tons still to be awarded.

729 tons, apartment house, 113th street and Amsterdam avenue, New York, to Paterson Bridge Co., Paterson, N. J.

655 tons, state highway viaduct, route 4, section 3, Teaneck, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

650 tons, work on Chicago avenue tunnel, Chicago, to Midland Structural Steel Co., Chicago.

618 tons, tuberculosis sanitarium, City hospital, Cleveland, to Ingalls Iron Works Co., Verona, Pa.

600 tons, bascule bridge, Seattle, to Wallace Bridge & Structural Co., Seattle.

600 tons, plant, Curtiss Sand & Gravel Co., Morrisville, Pa., to Belmont Iron Works, Philadelphia.

546 tons, state highway viaduct, route 4, section 3, Englewood, N. J., to McClintic-Marshall Corp., Bethlehem, Pa.

500 tons, bridge, New York Central railroad, Schuyler Junction, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh.

500 tons, theater, Boston, to Palmer Steel Co., Springfield, Mass.

480 tons, viaduct in Arkansas for Missouri Pacific railroad, to Virginia Bridge & Iron Co., Roanoke, Va.

450 tons, two dormitories for Notre Dame university, South Bend, Ind., to Edwards Iron Works, South Bend.

426 tons, gymnasium, New York university, to McClintic-Marshall Corp., Bethlehem, Pa.

400 tons, Davis Megan apartment, Upper Darby township, Pa., to Richard De Cou Co., Philadelphia.

400 tons, addition to Humberside Collegiate institute, Toronto, Ont., to Brown Structural Steel & Iron Works, Toronto.

380 tons, Red river bridge, Vernon, Tex., to Mosher Steel & Machinery Co., Dallas, Tex.

375 tons, service building, Lucerne county, Wilkes-Barre, Pa., to Bethlehem Construction Co., Bethlehem, Pa.; E. J. Couples Co., Kingston, Pa., general contractor.

350 tons, federal building, St. George, Staten Island, N. Y., to Berkshire Structural Steel Co., Brooklyn, N. Y.; Murch Bros., St. Louis, general contractors.

350 tons, furnace supports, Inland Steel Co., Indiana Harbor, Ind., to McClintic-Marshall Corp., Bethlehem, Pa.

350 tons, airplane hangar, Kansas City, Mo., to Kansas City Structural Steel Co., Kansas City.

345 tons, state highway work, De Kalb, Tex., to McClintic-Marshall Corp., Bethlehem, Pa.

323 tons, overhead spans, Acme Engineering Co., Milwaukee, to Milwaukee Bridge Co., Milwaukee.

310 tons, rectory, Paulist Fathers, East Fifty-ninth street, New York, to Hinkle Iron Co., New York.

300 tons, building, Sixth avenue and Forty-fourth street, New York, to Taylor-Fichter Steel Construction Co., New York.

300 tons, bridge for Missouri Pacific railrooad, at Fulton, Ark., to American Bridge Co., Chicago.

300 tons, state highway bridge, Coshocton, O., to Burger Iron Co., Akron, O., through Purdy Construction Co., Mansfield, O. Work also includes 70 tons concrete bars to be purchased.

270 tons, Sylvania Industrial Corp., Fredericksburg, Va., to Belmont Iron Works, Philadelphia.

260 tons, bridge, Erie railroad, Port Jarvis, N. Y., to American Bridge Co., Pittsburgh.

250 tons, building for Chicago Historical society, Lincoln Park, Chicago, to Reuter Bros., Chicago.

250 tons, express depot, Texas & Pacific railroad, Fort Worth, Tex., to North Texas Iron & Steel Co., Fort Worth.

250 tons, east cell block, sections A and B, foundry, bath and segregation building, Dannemora, N. Y., to American Bridge Co., Pittsburgh; Boya, John & Barr Inc., Columbus, O., general contractor.

226 tons, Clarington road bridge, Monroe County, O., to American Bridge

Awards Compared

	Tons
Awards this week	**26,704**
Awards last week	**34,106**
Awards two weeks ago	**19,353**
Awards this week in 1930	**21,285**
Av. weekly awards, 1930	**35,242**
Av. weekly awards, 1931	**38,232**
Av. weekly awards, May	**23,457**
Total awards to date, 1930	**794,398**
Total awards to date, 1931	**879,329**

Co., Pittsburgh, through Clemmer-Noah Co., Akron, O., general contractor.

225 tons, repairs, Washington bridge, Harlem river, New York, to Vulcan Rail & Construction Co., New York.

220 tons, office building, Port Authority, Washington bridge's New Jersey approach, to Belmont Iron Works, Philadelphia; Robert J. Murphy Inc., general contractor.

200 tons, Clinton prison, Dannemora, N. Y., to Kellogg Structural Steel Co., Buffalo.

200 tons, assembly building, torpedo station, Newport, R. I., to unstated fabricator.

200 tons, Fourth Church of Christ, Scientist, Ft. Washington avenue and 178th street, New York, to Bethlehem Fabricators, Inc., Bethlehem, Pa.; Skinner & Cook Co., general contractors.

200 tons, column repairs, Pennsylvania railroad, Thirty-first street and Eighth avenue, New York, to Shoemaker Bridge Co., Pottstown, Pa.

192 tons, bridge, Erie railroad, Big Tree, N. Y., to Ingalls Iron Works Co., Pittsburgh.

185 tons, municipal airport hangar and office building, Kansas City, Mo., through National Air Transport Inc., New York, to Austin Co., Cleveland.

184 tons, 2-story vocational school, Holyoke, Mass., to Haarmann Steel Co., Holyoke; Casper Ranger Construction Co, Holyoke, general contractor. Truscon Steel Co., Youngstown, O., awarded 30 tons of reinforcing bars.

160 tons, overhead crossing at Minong, Wis., to Lakeside Bridge & Steel Co., North Milwaukee, Wis.

156 tons, blast furnace bindings, Otis Steel Co., Cleveland, to McClintic-Marshall Co., Pittsburgh.

150 tons, plant unit, Merrimac Chemical Co., Everett, Mass., to A. L. Smith & Co., Chelsea, Mass.

150 tons, theological seminary, 175 Ninth avenue, New York, to Easton Structural Steel Co., Easton, Pa.; E. E. Paul Co., general contractor.

145 tons, stores and offices, Pearl and Willoughby street, Brooklyn, N. Y., to Kues Bros. Iron Works, Bronx, N. Y.

140 tons, staff house, Essex county hospital, Verona, N. J., building, Oliver Relish Co., Newark, N. J., and market sheds, Newark, three jobs, to H. R. Goeller Inc., Hillside, N. J.

135 tons, New York state highway bridge, job No. R. G.-2144, to American Bridge Co., Pittsburgh.

130 tons, attendants' building, Graystone Tower hospital, Morristown, N. J., to Jersey Steel Co., Trenton, N. J.

130 tons, institutional building, Hopewell, N. J., to Richard De Cou Co., Philadelphia.

129 tons, I-beam spans, Lederach, Montgomery county, Pa., to American Bridge Co., Pittsburgh.

125 tons, unit for Mt. Holyoke college, South Hadley, Mass., to unstated interest.

125 tons, bridge, Lederach, Montgomery county, Pa., to American Bridge Co., Pittsburgh.

122 tons, New York state bridge, letting of April 28, to Genesee Bridge Co. Inc., Rochester, N. Y.

111 tons, bridge, Erie railroad, Big Tree, N. Y., to Ingalls Iron Works Co., Pittsburgh.

110 tons, building, Fulton Savings Bank, Flatbush and Canton avenues, Brooklyn, N. Y., to George A. Just Co., Long Island City, N. Y.; William Kennedy Construction Co., general contractor.

102 tons, New York state bridge, letting of May 12, to Genesee Bridge Co. Inc., Rochester, N. Y.

100 tons, administration building, Boston City Charities, to New England Structural Co., Boston.

100 tons, emergency outlet gate, Hoover Dam, Boulder City, Nev., to Kyle Steel Construction Co., Los Angeles.

100 tons, apartment Kew Gardens, New York, to Sladon Iron Works, Bronx, N. Y.

100 tons, apartment, Bolton street and South Pelham parkway, Bronx, N. Y., to Diamond & Frazier Iron Works, Bronx.

100 tons, apartment, New Rochelle, N. Y., to Cosmic Iron Works, Bronx, N. Y.

Contracts Pending

22,500 tons, Union Inland terminal, Eighth and Ninth avenues, Fifteenth and Sixteenth streets, New York, Port of New York Authority, takes bids in about eight weeks.

6500 tons, Thirty-fifth street viaduct, Milwaukee; Wisconsin Bridge & Iron Co., Worden-Allen Co., Milwaukee Birdge Co., and Lakeside Bridge & Steel Co., have offered to furnish steel at cost in order to give men work in their own shops and in the bridge erection; commissioner to advertise for bids June 15.

6000 tons, bridges for Louisiana highway commission; bids June 30.

5300 tons, estimated, postoffice and federal building, Minneapolis.

4100 tons, bridge over Desplaines river on Illinois state route 46; Duffin Iron Co., Chicago, low.

3122 tons, bridge over Red river, Shreveport, La., Louisiana highway commission; bids June 30.

2400 tons, bridges for Illinois highway commission.

2019 tons, Santa Clara river bridge, Ventura county, Calif.; bids in.

1800 to 2165 tons, plant, Addressograph-Multigraph Corp., Cleveland; general contract to H. K. Ferguson Co., Cleveland.

1476 tons, bridgework, Rapides parish, Louisiana highway commission; bids June 30.

1200 tons, bridgework, Ouachita parish, Louisiana highway commission; bids June 30.

1000 tons, several New York state bridges.

900 tons, Metropolitan avenue bridge, English Kills, Brooklyn, N. Y.; readvertised bids in, department of plants and structures, New York.

580 tons, bridge, Red river, Wilbarger county, Tex.; bids in.

500 tons, gymnasium, Villanova college, Villanova, Pa.

500 tons, school, Merion township, Pa.; new bids June 16.

500 tons, prison, Walkill, N. Y.

500 tons, statae highway work in South Carolina.

350 tons, Chronic hospital, Warrensville sanitarium, Cleveland; bids by city welfare department.

350 tons, armory, Syracuse, N. Y.

300 tons, postoffice and courthouse, Rutland, Vt., bids June 16, former bids rejected.

220 tons, Hellgate bridge, Lane county, Oregon; bids in; Lindstrom & Feigenson, Portland, Oreg., low.

160 tons, state bridge at Fryeburg, Me.

147 tons, Epp apartment house, San Francisco; bids being received.

100 tons, bridge, Philadelphia & Reading railroad, near Philadelphia.

100 tons, state bridge at Cambridge, Vt.

Concrete Bars

New York, Chicago Report Several Large Jobs Up—Terminals to Take 3500 Tons, Bridges in Illinois, Louisiana and Texas, 3227 Tons—Lettings Less Numerous

REINFORCING BAR PRICES, PAGE 75

New York—Concrete reinforcing bar lettings dropped following last week's several large awards. Bids went in this week on several hundred tons for sewers in Manhattan and Bronx. For the St. Johns Park terminal, New York Central railroad, close to 2000 tons remains to be placed. Another terminal, out in eight weeks, will take 3500 tons. Small lots are steadier, but shading of 1.98c, New York, is still noted on large contracts.

Boston—Sharp upturn in demand for concrete bars seems to have spent itself.

Philadelphia—Concrete bars are 1.55c to 1.60c, Pittsburgh. Concrete Steel Co. booked 350 tons at Baltimore and 150 tons at Reading, Pa.

Chicago—About 1000 tons of reinforcing bars is being awarded for the Pennsylvania railroad track elevation, the program including 23 bridges in Chicago. Illinois highway commission took bids May 29 on ten highway bridges, about 1000 tons,

(*Concluded on Page* 83)

Awards Compared

	Tons
Awards this week	**9,040**
Awards last week	**12,357**
Awards two weeks ago	**5,510**
Awards this week in 1930	**3,698**
Av. weekly awards, 1930	**6,990**
Av. weekly awards, 1931	**7,279**
Av. weekly awards, May	**8,131**
Total awards to date, 1930	**160,029**
Total awards to date, 1931	**167,424**

Strip

Lack of Demand Gives Market Little Test—Orders Growing Smaller as Summer Nears

STRIP PRICES, PAGE 75

Pittsburgh — Strip business showed a more substantial decline during the latter part of May and the prospective quiet in automotive operations points to a further decline in strip demand this month. Third quarter inquiry is light and there has been little opportunity to test the advance instituted on hot strip for that period. The market continues 1.50c and 1.60c on current shipments of hot strip with third quarter asking prices $1 a ton higher. Cold-rolled strip is 2.15c to 2.25c. Strip mill operations remain around 35 to 40 per cent with cold mill output at 25 per cent.

Philadelphia—Although not fully tested 1.55c, to 1.65c, Pittsburgh, appears to be the market on wide and narrow hot-rolled strip. Cold-rolled strip is 2.15c. Trading in both classes is light.

Youngstown, O.—Tapering in the volume of specifications received by local mills from consumers of both hot and cold-rolled strip continues to be noted from week to week. Mills continue to operate at around 65 to 70 per cent of capacity. Quotations, however, appear to be steady and unchanged for both hot and cold-rolled.

Cleveland—Consumers' needs in strip steel are easily satisfied. Wide and narrow hot-rolled bring 1.55c and 1.65c, Pittsburgh, respectively. Only small sales of cold are reported but these are at 2.15c, Cleveland. The 2.25c, Cleveland, quotation is for extended shipment and no such orders are being booked.

Chicago—Cold-rolled strip production is expected to decline shortly, as orders, chiefly from automotive sources have been tapering. Occasional orders are closed at 2.15c, Pittsburgh-Cleveland. All buying is for spot needs.

Warehouse Prices Off at Buffalo, Philadelphia

Warehouse Prices, Page 97

Philadelphia — Jobbers have reduced galvanized and black sheets 10 cents per 100 pounds to 3.85c and 3.40c, respectively. Distributors of a leading brand of galvanized iron sheets now quote gage extras under new classification. A 5-cent differential applies to all heavier gages under No. 24 base. On lighter gages, Nos. 25, 26, 27 and 28, prices are 15, 25, 35 and 50 cents above base, respectively. Most jobbers report daily sales rate in May about on a par with April.

Boston—Demand for warehouse supplies is fair for small projects. Collections are good.

New York—Buying of warehouse steel is less active. May shipments compared favorably with April's. Prices are subject to shading. Sheets and cold-finished bars are fairly firm. Recent reductions on strip failed to stimulate buying.

Buffalo—Holiday inroads on warehouse business were severe. Building prospects are bright for early June.

Pittsburgh—Sales are slow and generally unchanged except in sheets, which are slightly more active than a month ago. Prices are lower on bars, sheets, bands, hoops and corrugated roofing.

Detroit—May's warehouse volume equalled April. The past week was featured by days of good activity and others of extreme quiet. Prices are unchanged following a general adaptation of the recently announced changes.

Cincinnati — Character of warehouse demand and tonnage during May disclosed little change from April. The price list is unaffected by changes elsewhere.

Chicago—Warehouses in this district are making no change in cold rolled strip prices despite reductions in the East. Buying still is well diversified, but is in extremely small quantities.

Steel Operations Hold Close to 41 Per Cent

Youngstown, O.—Mahoning valley steel operations continue unchanged at 41 per cent. Mahoning Valley Steel Co. resumed operations at its Niles sheet plant. Carnegie Steel Co. is testing out its new small bar mill which shortly will go into commercial production. Republic Steel Corp. stays at 45 per cent, Carnegie Steel Co., the same, and Youngstown Sheet & Tube Co. is estimated to operate 30 per cent. Sharon Steel Hoop Co. is unchanged. Sheet production is a shade higher than a week ago. Pipe mill schedules reflect improvement. The three Empire Steel Corp. plants are idle, pending plans by C. H. Henkel, receiver. Newton Steel Co. will increase at Monroe, Mich., but Newton Falls, O., will remain idle.

Philadelphia—Eastern ingot operations are down fractionally to 37 per cent. A leading mill continues at 43 per cent of capacity.

Buffalo — Operations dropped 9 points in one week to 40 per cent today. Only 15 open-hearths are on out of a possible 37. Further curtailment is in prospect.

Pittsburgh—Ingot production is lower at slightly above 40 per cent. Two corporation and one independent blast furnace stacks have been blown out, leaving 19 out of 54 steelworks' furnaces in the district active. Sheet operations are unchanged at 35 to 40 with tin plate lower at 65 to 70. Strip and pipe remain at 35 to 40.

Cleveland—Down two from last week's 20, Cleveland district has 18 open-hearth furnaces operating out of a potential 34 or 53 per cent, a drop of six points. The leading local steel producer has seven on out of 14, one less than a week ago, and another interest put one out.

Chicago — Declining two points, Chicago ingot production stands at 43 per cent. Active steelworks blast furnaces have been reduced to 13 out of 36 by the banking of another Gary furnace by the leading interest. It now has two banked there.

Birmingham, Ala. — Eleven open-hearth furnaces on, including two of the enlarged Gulf States Steel Co., maintains ingot production at 50 per cent. Structural, reinforcing concrete bar, sheet and plate mills require raw material at a better rate.

Iron Ore Shipments Slow; Market Is Quiet

Iron Ore Prices, Page 86

Cleveland—Vessel shipments of iron from the Lake Superior district in May totaled 1,769,295 tons, compared with 6,979,213 tons in the month last year. To June 1 the movement amounted to 1,945,216 tons, 27 per cent of the shipments in the comparable period last year, 7,087,132 tons. The leading producer did not begin operating its vessels until late in May, and June will show considerable improvement. No more business is expected by sellers until toward fall.

New York—Approximately 20,000 tons of North African low phosphorus ore is reported to have been purchased by the Canadian Furnace Co., for its stack at Port Colborne, Ont., recently relighted.

Concrete Bars

(*Concluded from Page 79*)

and about 100 miles of highway surfacing and construction.

Pittsburgh—May business in reinforcing bars was substantially larger than April although well under the 1930 volume. Prices lack strength and shading of $1 a ton from the 1.65c price on stock lengths is becoming more common.

Contracts Placed

1350 tons, filtration plant reservoir, Louisville, Ky., to Jones & Laughlin Steel Corp., Pittsburgh.
1150 tons, two reservoir covers for St. Louis Municipal Waterworks, to Missouri Rolling Mills Corp., St. Louis.
1000 tons, track elevation at Chicago for Pennsylvania railroad, to unstated interest.
470 tons, Loblaw warehouse, Clinton street food terminal, Buffalo, to a Buffalo district producer.
400 tons, mesh, board of transportation contract, Brooklyn, N. Y., to Concrete Steel Co., Pittsburgh.
350 tons, automobile sales room, Wilshire boulevard, Los Angeles, to unstated interest.
350 tons, school, Baltimore, to Concrete Steel Co., New York, through H. L. Moss, Baltimore, general contractor.
300 tons, overhead bridges in Wisconsin, to Joseph T. Ryerson & Son Inc., Chicago.
300 tons, three laboratories, California Institute of Technology, Pasadena, Calif., to unstated interest.
275 tons, John Rogers high school, Spokane, to Northwest Steel Rolling Mills, Seattle.
242 tons, Kress store, Sacramento, Calif., to Truscon Steel Co., San Francisco.
235 tons, east cell block, sections A and B, foundry, bath and segregation buildings, Clinton prison, Dannemora, N. Y., to Truscon Steel Co., Youngstown, O.; Boya, John & Barr Inc., Columbus, O., general contractor.
220 tons, highway work in Sacramento county, Calif., to unstated interest.
205 tons, Hetch-Hetchy pipeline project, San Francisco, to unstated interest.
200 tons, building, Claremont college, Claremont, Calif., to unstated interest.
200 tons, jail, Salinas, Calif., to Concrete Engineering Co., San Francisco.
200 tons, foundations, buildings, Brentwood hospital, Long Island, N. Y., to Igoe Bros., Newark, N. J.
175 tons, covered reservoir, Springfield, Mass., to Concrete Steel Co., Pittsburgh; E. H. Latham Co., Columbus, O., general contractor.
150 tons, court house, Reading, Pa., to Concrete Steel Co., New York.
150 tons, Illinois road work, to Kalman Steel Co., Chicago.
140 tons, Textile building, Smithfield, Me., to Bancroft & Martin Rolling Mill Co., Portland, Me.
138 tons, joists (96 tons), bars (42 tons), service building, Lucerne county, Wilkes-Barre, Pa., to Truscon Steel Co., Youngstown, O.; E. J. Couples, Kingston, Pa., general contractor.
125 tons, four bridges in Tulare county, Calif., to unstated interest.
115 tons, army quartermaster, San Juan, P. R., to C. R. Rossi, Porto Rico.
100 tons, Fifteenth street sewer, San Francisco, to Soule Steel Co., San Francisco.
100 tons, pier at Gravesend Bay, Brooklyn, N. Y., to Joseph T. Ryerson & Son Inc., New York; Allen N. Spooner & Son, general contractor.
100 tons, Illinois road work, to Concrete Engineering Co., Chicago.
100 tons, shapes and bars (67) Elmore County court house, Ala., to Southern General Fireproofing Co., Atlanta, Ga.; Algeron Blair, Montgomery, Ala.,
100 tons, general exhibition building, Century of Progress exposition, Chicago, to Calumet Steel Co., Chicago.
100 tons, Washington state highway work, to Northwest Steel Rolling Mills, Seattle.

Contracts Pending

900 tons, Chicago postoffice.
3500 tons, Union Inland terminal, Eighth and Ninth avenues, Fifteenth and Sixteenth streets, New York, Port of New York Authority takes bids in about eight weeks.
1000 tons, ten Illinois highway bridges; bids May 29.
929 tons, bridge over Red river, Shreveport, La., Louisiana highway commission; bids June 30.
614 tons, sewage treatment plant, Phoenix, Ariz.; bids received.
611 tons, bridgework, Rapides parish, Louisiana highway commission; bids June 30.
450 tons, St. Paul courthouse.
400 tons, building, Motorists' Association of Illinois, Chicago.
390 tons, highway between Peekskill and Cortlandt, N. Y., Westchester county park commission; bids June 22.
337 tons, bridgework, Ouachita parish, Louisiana highway commission; bids June 30.
300 tons, municipal dam, Cumberland, Md.; Vang Construction Co., general contractor.
268 tons, bridge over Santa Clara river, Ventura county, Calif.; bids received.
200 tons, school, Merion township, Pa.; new bids June 16.
200 tons, bridge, Red river, Wilbarger county, Tex.; bids in.
150 tons, bridge, McLennan county, Tex.; bids in.
114 tons, crossing over Southern Pacific tracks, Sacramento, Calif.; bids received.
100 tons, office building, McPherson street, Los Angeles; bids being received.

Pipe

Line Pipe Orders Exceed 72,500 Tons—Hetch Hetchy Line Included—Cast Grades Slow Up

PIPE PRICES, PAGE 97

New York—Cast pipe buying and inquiry is slower. Prices are easy, attractive tonnages bringing out $30 to $32 a ton, eastern foundry. About 1500 tons was let and a contractor is about to close on 3700 tons for the Ward Island disposal plant. New inquiry is generally limited to small lots, although several thousand tons pend up state. Several New York city departments took bids this week on wrought iron, galvanized and steel pipe with fitting requirements for the year's last half. Satisfaction is being generally expressed by pipe sellers over the recent revision in prices on direct mill shipments. The quoted discounts of base minus two 5's came in for considerable criticism. The present discount of base minus 5 and 2½ is more satisfactory not only because it is slightly higher but it precludes certain practices which might have developed in relation to pipe jobbers.

Pittsburgh—Orders for line pipe still involve only relatively small lots and are few in number. Humble Pipe Line Co. is understood to have placed 9000 tons of 8 and 10-inch seamless pipe with a local mill for a 100-mile line in Texas. A 10,000-ton line for Magnolia Pipe Line Co. went to the Milwaukee producer. Standard pipe holds to its recent quiet rate but early improvement is expected.

Cleveland—Although most of the larger steel pipeline projects seem to have been ordered, occasionally one of the smaller ones long pending is placed. Ford, Bacon & Davis closed on 6500 tons of 4 to 16-inch with Republic Steel Corp. This material is for Memphis Natural Gas Co., Memphis, Tenn.

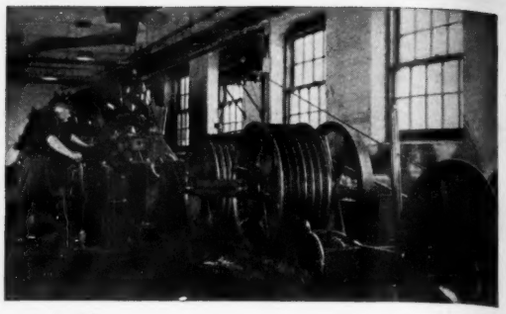
Chicago—While carload orders for cast pressure pipe, 6 to 24-inch, are being quoted at $35 to $36, Birmingham, municipal inquiries continue to bring concessions of $2 to $4 a ton. Besides awarding 5700 tons of 6 to 12-inch pipe, Chicago also may have an inquiry out soon for about 5000 tons of large size pipe, 30 to 48-inch. Racine, Wis., closed on 750 tons of 30 to 36-inch.

Birmingham, Ala.—Bidding is active on considerable cast pipe tonnage. Quotations remain weak, $35 to $36 on 6-inch and over being cut.

Cast Pipe Placed

5250 feet, up to 2-inch wrought iron pipe, police department, New York, to Green-Wolf Co. Inc., New York.
3040 feet, wrought iron pipe, for lock 26, U. S. engineer, Huntington, W. Va., to Virginia Machinery & Well Co., Richmond, Va.
800 tons, 12-inch, for Manhattan, N. Y., to unstated eastern foundry.
750 tons, 30 to 36-inch pipe for Racine, Wis., to James B. Clow & Sons, Chicago.
500 tons, 6 to 12-inch, for Yorktown Heights, N. Y., to R. D. Wood & Co., Florence, N. J.
156 tons, various sizes cast pipe for Portsmouth, N. H., to Warren Found-

Where Wire



becomes ROPE

Reels of strands spin around and around ... finished rope creeps out... you stop and stare in mute wonder at this hurdy gurdy that changes wire and fibre core into ropes of steel.

So much for the machines that form the rope.

But in the Wickwire Spencer Mills, from the time the ore is smelted, ingots cast, billets formed, rods rolled and wire drawn, right down to the final fabrication, every process has its romance, its technicalities, its points that must be considered to produce a quality product. Wickwire Spencer controls all these processes . . . therefore it produces Quality Wire Rope.

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City

Buffalo, Chicago, Detroit, Cleveland, Philadelphia, Worcester, Tulsa, 1314 East Archer St., *Pacific Coast Headquarters:* **San Francisco;** *Branches and Warehouses:* **Los Angeles, Portland, Seattle.**

WICKWIRE SPENCER *Wire Rope*

Send for our book. It is free and will prove of great value in selecting.

ry & Pipe Co., Phillipsburg, N. J.
136 tons, 4 to 10-inch class 150 cast pipe, national guard training camp, San Luis Obispo, Calif., to unstated interest.
135 tons, 6 to 12-inch class B cast pipe for Glendora, Calif., to unstated interest.
115 tons, various sizes cast pipe for Somerville, Mass., to Donaldson Iron Co., Emaus, Pa.
100 tons, 12-inch cast pipe for Wilton, N. H., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

40,000 tons, 58 to 70-inch welded steel pipe, Hetch Hetchy pipe line, San Francisco, to Western Pipe & Steel Co., San Francisco.
10,000 tons, 12-inch steel pipe, Magnolia Pipe Line Co., to A. O. Smith Corp., Milwaukee.
9000 tons, 8 and 10-inch seamless steel pipe, Humble Pipe Line Co., to National Tube Co., Pittsburgh.
6500 tons, 4 to 16-inch, for Memphis Natural Gas Co., Memphis, Tenn., to Republic Steel Corp., Youngstown, O.; Ford, Bacon & Davis Co., New York, engineers. Noted last week as 9000 tons, estimate revised.
4500 tons, including bars, sheets and wire for pipe line for Louisville, Ky., to Lock Joint Pipe Co., Ampere, N. J.
4000 tons, 12 to 20-inch steel pipe for Pennsylvania railroad station, Philadelphia, to Republic Steel Corp., Youngstown, O., and National Tube Co., and Spang, Chalfant & Co. Inc., Pittsburgh, in addition to 2000 tons awarded Youngstown Sheet & Tube Co., as noted in STEEL of May 14.
3000 tons, ¾ to 8⅝-inch outside diameter steel pipe for Phoenix Utility Co., for installation in Montana, to National Tube Co., and Jones & Laughlin Steel Corp., Pittsburgh, and Republic Steel Corp., Youngstown, O.
450 tons, 36-inch welded pipe for St. Louis, to McClintic-Marshall Corp., Bethlehem, Pa.

Cast Pipe Pending

2100 tons, 12-inch centrifugal cast pipe for Los Angeles; bids opened.
1150 tons, 6 to 12-inch cast pipe for Fox Point, Wis.; bids June 4.
1000 tons, 16 to 18-inch cast pipe for Frederick, Md.; bids in.
950 tons, 16 and 20-inch cast water pipe, for main extension, Tonawanda, N. Y.; Western New York Water Co., Buffalo, taking bids.
160 tons, 20-inch cast pipe for Manhattan, N. Y.; bids June 9, contractors' letting, department water supply, gas and electricity.
160 tons, 8 and 12-inch cast pipe for Fall River, Mass.; United States Pipe & Foundry Co., Burlington, N. J., low.
135 tons, 24-inch cast sewer section H, Blindbrook, N. Y., Westchester Sanitary commission; bids being taken.
100 tons, 8-inch cast water pipe, Kenmore, N. Y., closes bids June 15.
Unstated tonnage, 2930 feet, 6 and 8-inch cast pipe with fittings, water main extension, Ft. Meade, Md.
Unstated tonnage, 3000 feet 8-inch and 4000 feet 6-inch cast pipe for Lynn, Mass.; bids June 1.

Steel Pipe Pending

2700 feet, small sizes, constructing quartermaster, Mitchel Field, N. Y.; bids June 8.

Wire

Lessened Requirements from Consumers and Jobbers Bring Quiet Status—Prices Steady

WIRE PRICES, PAGE 75

Chicago—Sales of merchant wire have tapered but manufacturers' wire has made less change, despite lower automotive production. Mills plan to carry light stocks, and production may drop shortly below the existing 35 to 40 per cent range. Third quarter prices are likely to be named soon on the existing basis of $1.95, Chicago or western mills, for wire nails, and 2.25c for plain wire. Annealed fence wire is 2.40c to 2.50c. Jobber stocks that recently were built up have had little liquidation.

Worcester, Mass.—Fine wire production is increasing in contrast to the general production level of the market. Wickwire Spencer is calling back to its plant at Palmer many men formerly employed in this division. Otherwise the market is following the general gradual decline which began several weeks ago.

New York—Nails appear firmer here, with $1.90, Pittsburgh, the usual price. This stronger tendecy is attributable more to the attitude of sellers than to any increase in demand. Wire is 2.20c, Pittsburgh.

Pittsburgh—Wire demand still is tapering although more moderately than during recent weeks. Incoming business during May was substantially lower than during April and shipments also declined. Third quarter price announcement is delayed, with the market currently lacking strength. Wire nails are $1.80, the $1.90 price finding reduced application. Plain wire is at 2.20c, with wire rods usually $35.

Cleveland—Some nut and bolt manufacturers maintain a fair demand for wire, wire rods, etc., but rivet makers' demands are low. Other users of manufacturers' wire buy intermittently. Calls from agricultural districts are well maintained but jobbers continue to buy in small lots to maintain stocks. Plain wire is quoted at 2.20c to 2.30c, Cleveland, and nails at $1.90 to $2 a keg. Sales of the latter product are small.

Bolt, Nut, Rivet Price Steady for Third Quarter

Bolts, Nuts, Rivets Prices, Page 75

Pittsburgh—May business in bolts, nuts and rivets was slightly ahead of the April volume. Little additional improvement is looked for this month. Third quarter contracts are expected to be issued within a week or ten days at unchanged prices of 73 off for bolts and nuts and 2.75c, Pittsburgh, for structural rivets. Production averages 30 to 35 per cent.

Philadelphia—Possible revision of specifications may reduce the tonnage of upset rods for the National Dock & Terminal Co., Camden, N. J., to 75 tons, but it still remains the leading feature of the bolt and nut market.

Cleveland — Miscellaneous orders for nuts and bolts support a 40 per cent operating schedule. Rivets are lifeless. Large rivets are quoted 2.75c, Cleveland, while on small rivets, 70 and 10 to 70, 10 and 5 off are named. Nuts and bolts appear to be firmly held at 73 off list.

Chicago — Solicitations for third quarter contracts for bolts, nuts and rivets are under way, and a number of contracts have been signed on the basis of 73 off for bolts and nuts, and 2.85 for large structural rivets in carloads. These prices are an extension of second quarter quotations. Further reduced orders are expected this month from automotive buyers. May specifications were a little below April. Production is 40 per cent.

Tin Plate Price Up Soon For Decision; Output Less

Tin Plate Prices, Page 75

Pittsburgh—Tin plate specifications and operations continue to decline slowly. Production now is 65 to 70 per cent, a reduction of several points during the past two weeks. The decline in specifications is attributed to a slight excess in buying by leading consumers earlier in the year. A fairly steady trend is looked for over the next 30 days, with some prospects for improvement later in the summer. Tin plate continues $5, Pittsburgh, per base box. Inasmuch as contracts for cans are extended over the season it is unusual for the price of tin plate to be changed at midyear and no intimation has been made by tin plate producers regarding any change from that practice this year.

New York—An early announcement of tin plate prices for second half is expected. Decline in the price of pig tin may result in a reduction.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, No. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.26
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.00
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.75
Tenn., Bir. base, local del.	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	17.50
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	17.76

FOUNDRY, NO. 1X

Buffalo fur., local del.	18.50
Eastern, del. Phila.	18.26

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	17.50
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	16.00 to 16.50
Pittsburgh, delivered	16.63 to 17.63
Eastern Penn., del.	17.00
Buffalo fur., local del.	16.50 to 17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	23.76 to 26.69
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.40 to 2.50
Connellsville foundry	3.25 to 4.75
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	8.70 to 9.10
Chicago, ovens	7.50
New England, del.	10.50
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.00
Philadelphia, del.	8.75

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports	
Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.25 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	22 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$29.00 to 30.00
Pittsburgh, bessemer	29.00 to 30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00
Philadelphia	35.30
Chicago	30.00 to 31.00
Forging, Chicago	35.00 to 36.00
Forging, Pittsburgh	35.00 to 36.00
Forging, Philadelphia	34.30

SHEET BARS

Pittsburgh	29.00
Youngstown	29.00
Cleveland	29.00
Chicago	30.00 to 31.00

SLABS

Pittsburgh	29.00 to 30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

WIRE RODS

Pittsburgh, Cleveland	35.00
Chicago	36.00

SKELP

All grades, Pittsburgh	1.60c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	30.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.00 to 1.10
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	150.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$13.50 to 14.00
Washed gravel, import duty paid east, tide, gross ton	19.00

WEIRTON

Galvanized Corrugated SHEETS for Roofing Purposes

Complete production control, both mechanically and metallurgically, from ore mine to finished product, contributes to the outstanding characteristics of Weirton Galvanized Corrugated Steel Sheets — and other Weirton products.

Write in Weirton on your specification sheets and you will always receive products that are preeminently suited for your requirements.

WEIRTON STEEL CO.
Division of National Steel Corporation
WEIRTON W. VA.
SALES OFFICES IN ALL PRINCIPAL CITIES

WEIRTON PRODUCTS INCLUDE

Pig Iron
Open Hearth Steel
Billets—Slabs—Sheet Bar—Skelp
Coke Tin Plate
Tin Mill Black Plate
Copper Bearing Terne Plate
Hot and Cold Rolled Strip Steel
and
Strip Steel Sheets
Galvanized, Black and Blue
Annealed Sheets
Single Pickled Full Finished
and Auto Body Sheets

Pig Iron

Lower Basic Prices at Pittsburgh Have Weakening Effect —Forward Interest Lacking

PIG IRON PRICES, PAGE 86

Pittsburgh—The pig iron price situation is unsettled by the willingness of steelworks to dispose of surplus stocks at well under recent market levels. Such opportunities so far have been presented only on basic iron, but it is believed equally sharp concessions would result on the appearance of good inquiries for other grades. The sale of substantial tonnages of basic iron by a Wheeling, W. Va., district producer in this district has been followed by an inquiry from nearby steelworks for unstated tonnage on which certain producers quoted well below the recent nominal market, although the business has not been closed as yet. Recent transactions lead sellers here to regard as the basic market $16.63 to $17.63, delivered, Pittsburgh, and $16 to $16.50, Pittsburgh furnace. With demand limited, $17, valley, still is quoted on bessemer, malleable and foundry. New business and shipments are declining.

Boston—A majority of New England foundries are operating only one or two days a week. Sales of pig iron in the past week did not exceed 800 tons. An inquiry for 1000 tons of malleable is pending. Prices are steady.

New York—Demand for pig iron is more active, over 5000 tons of new inquiry appearing this week, following sales amounting to 3000 tons, not including 1000 tons placed for the Malleable Iron Fittings Co., Branford, Conn. The Foran Foundry & Mfg. Co., Flemington, N. J., has booked 500 tons of iron castings and the Gould Coupler Co., Depew, N. Y., 200 tons of steel castings for which some iron may be placed later. Prices are easy but unchanged.

Philadelphia—The Lorain Steel Co., Johnstown, Pa., purchased 1000 tons of copper bearing, low phosphorus iron, the order reported placed with the Bethlehem Steel Co. The Panama canal commission bought 100 tons of low phosphorus from Frank Samuel & Co. The navy will ask bids on 224 tons of low phosphorus. Standard low phosphorus is off $1 a ton at Philadelphia. Other prices are steady, and demand is quiet.

Youngstown, O.—Steel foundries in northern Ohio and western Pennsylvania are operating at slightly better rates and the movement of standard, copper-free, low phosphorus pig iron from valley producers has improved accordingly. It is probably twice as heavy as the combined movement of all other grades and it brings $27, valley. Small sales of basic are being made by valley furnaces at $17, valley. Such sales were made Monday by the only two valley producers of basic and the price paid was $17, furnace, these following sales last Friday at the same figure. One basic producer in the valley in the past month has sold a total of 400 tons of standard basic in scattered lots at $17, while the only other valley furnace interest with basic for the open market has sold in that period a total of 700 tons at $17, furnace. Small lots of malleable, No. 2 foundry and bessemer also bring $17. The Republic Steel Corp. has blown in the No. 5 stack of its Haselton group, but is blowing out No. 2 for relining. The Youngstown Sheet & Tube Co. has restored the blast on one of its Campbell works stacks that has been banked for a fortnight.

Buffalo—Only three blast furnaces were in operation over the week-end, due to a breakdown in one stack which went back into production today. This stack may be banked shortly. Sales and inquiries were at the vanishing point during the week.

The Canadian Furnace Co. Ltd., blew in its blast furnace at Port Colborne, Ont., May 27, after being down six months.

Cleveland—Shipping instructions for June do not indicate any improvement over May, and if the automotive industry takes less iron, as now seems probable, the aggregate will be much less than last month. Sellers anticipate quiet conditions until fall when another seasonal increase is expected to develop. Inquiries are for small lots and except the Westinghouse Electric & Mfg. Co.'s inquiry for Cleveland and Trafford City, Pa., reflect lack of interest in third quarter. Decoration day tended to restrict sales, and the total booked by furnace interests with headquarters in Cleveland in the past week was 8000 tons. Lake furnace prices are unchanged at $16 to $17, base, for delivery in competitive districts, while $17, base, prevails for delivery in Cleveland.

Chicago—Several negotiations for pig iron for third quarter are developing, although little has been placed for that period. Prices are being asked on 1000 tons of foundry iron for shipment east of here. The base price remains $17.50, furnace, except occasional sales of steelworks iron. Automotive shipments are tapering. One western automobile builder is down and suspending shipments temporarily.

Cincinnati—Influence of a holiday partly accounted for a decrease in total sales of pig iron during the past week, dropping to less than 1500 tons. Northern iron in some territories continues weak. A central Ohio melter is inquiring for 300 tons of northern iron.

St. Louis—Demand for basic iron improved for a few days while users were completing railroad orders. Gray iron foundries also had a moderate increase in business, which has tapered off again.

Birmingham, Ala—Inquiries and sales continue light. Shipments to Atlantic coast points are not numerous, and the total amount is relatively small.

Ferroalloy Shipments Are Near Year's Lowest

Ferroalloy Prices, Page 86

New York—While steelmaking operations continue downward, shipments of spiegeleisen are fairly well maintained. There has been an increasing use of high silicon spiegeleisen, in some cases for experimental purposes. This material is being sold at $35, furnace, in carloads, against $30, furnace for domestic material, 19 to 21 per cent. Foreign spiegeleisen, 26 to 28 per cent, is nominal, no sales having been reported recently. Ferromanganese is unchanged at $85, duty paid. Current movements are largely against contracts. A leading seller has revised its prices on some of the special alloys as follows: 14 to 16 per cent ferrosilicon in carload lots, $31, per gross ton, f.o.b. furnace; silico spiegel in carload lots $42.50; ton lots and less $47.50 per gross ton, f.o.b. furnace; silico manganese, 2.50 per cent carbon grade, $105; 1 per cent carbon, $115, per gros ton, with freight charges allowed, for contracts in carload lots; spot prices of both grades $5 per ton higher. A new product known as manganese briquets are offered in ton lots at 5¾c per pound of briquets, and in less than ton lots 6c, both prices with freight charges allowed.

Pittsburgh—Shipments of ferroalloys continue to decline, specifications for ferromanganese and spiegeleisen approaching the lowest level of the year. The spot market continues dull, with prices unchanged on small lots at $89.79, delivered, for ferromanganese and $30, furnace, for spiegeleisen. Prices on other ferroalloys are unchanged.

Scrap

Downward Trend of Prices Is Checked in Spots—Light Buying Causes Decline in Others

Chicago—Definite check to the recent falling steel scrap prices has been brought about in part by the further purchases of heavy melting steel at $9 by the Gary melter. While these orders were only about 2000 tons each, a stabilizing effect resulted. Shipments of outside scrap into this market are thinning perceptibly, despite 5000 to 6000 tons of railroad material sold here last week, and small offerings by the Santa Fe and Burlington railroads in the last few days. Railroad scrap prices are relatively low, with melting steel on recent lists closing at about $9, delivered in the Chicago switching district. Railroads are withholding a part of their scrap. Yard production of both open hearth and foundry scrap is unprofitable. With foundries casting at 30 to 35 per cent

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	$8.00 to $9.00
Boston, dealers	5.00 to 5.25
Buffalo, No. 1	9.50 to 10.00
Buffalo, No. 2	8.00 to 8.50
Chicago	8.50 to 9.00
Cinci., deal.	8.25 to 8.75
Cleve., No. 1	9.50 to 10.00
Cleve., No. 2	9.00 to 9.25
Det., No. 1 deal.	7.50 to 8.00
Det., No. 2 deal.	6.00 to 6.50
E. Pa. del. mill	9.00 to 10.00
N. Y. deal. R. R.	5.50 to 6.50
N. Y. deal. No. 2	4.50 to 5.00
N. Y. deal. yd.	5.00
Pitts., No. 1	10.50 to 11.00
St. L. No. 1 sel.	8.50 to 9.00
Federal, Ill.	8.00 to 8.50
Granite City, Ill.	7.25 to 7.75
Valleys, No. 1	10.00 to 10.50

COMPRESSED SHEETS

Buffalo, dealers	8.00 to 8.50
Chicago	7.00 to 7.50
Cleveland	8.50 to 8.75
Detroit, dealers	7.25 to 7.75
E. Pa. new mat.	9.00 to 10.00
Pittsburgh	10.50 to 11.00
Valleys	9.50 to 10.00

BUNDLED SHEETS

Buffalo	6.00 to 6.50
Cinci., deal	7.75 to 8.25
Cleveland	7.00 to 7.25
Eastern Pa.	7.50 to 8.00
Pittsburgh	8.50 to 9.00
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	4.00 to 4.50
Cincinnati	4.75 to 5.25
Detroit, dealers	4.25 to 4.75
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	10.00 to 11.00
Boston, dealers	4.00 to 5.50
Buffalo	12.50 to 13.00
Chicago (3 ft.)	10.50 to 11.00
Chicago (2 ft.)	11.25 to 11.75
Cinci., deal.	13.00 to 13.50
Detroit, deal.	11.50 to 12.00
Pitts. (open-hearth, 3 ft and less)	13.00 to 13.50
St. Louis	12.00 to 12.50

STOVE PLATE

Birmingham	7.00 to 8.00
Boston, con.	5.00 to 5.50
Buffalo	7.75 to 8.00
Chicago, net	7.00 to 7.50
Cinci., deal. net	4.50 to 5.00
Det., net deal.	4.00 to 4.50
Eastern Pa.	7.50 to 8.00
N. Y., deal. mill	4.00 to 4.50
St. Louis	7.00 to 7.50

COUPLERS, SPRING

Buffalo	12.50 to 13.00
Chicago	9.75 to 10.25
Eastern Pa.	13.00
Pittsburgh	13.00 to 13.50
St. Louis	8.75 to 9.25

ANGLE BARS—STEEL

Chicago	9.75 to 10.25
St. Louis	8.50 to 9.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	14.00 to 14.50
Cleveland bil. and bloom crops	13.50 to 14.00
Eastern Pa.	15.50 to 16.00
Pittsburgh billet bloom crops	15.00 to 15.50
Pitts. sheet bar crops	14.00 to 14.50

FROGS, SWITCHES

Chicago	8.50 to 9.00
St. Louis	9.00 to 9.50

SHOVELING STEEL

Chicago	8.50 to 9.00
Cleveland	6.25 to 6.75
St. Louis	8.00 to 8.50

RAILROAD WROUGHT

Birmingham	8.00 to 8.50
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	7.75 to 8.25
Buffalo, No. 2	9.50 to 10.00
Chicago, No. 1	8.25 to 8.70
Chicago, No. 2	8.50 to 9.00
Cinci., No. 2	8.25 to 8.75
Eastern Pa.	10.00
N. Y., No. 1, deal.	9.00 to 9.50
Pitts., No. 2	10.50 to 11.00
St. Louis, No. 1	6.00 to 6.50
St. Louis, No. 2	8.00 to 8.50

SPECIFICATION PIPE

Boston	5.00 to 5.25
Eastern Pa.	11.50 to 12.00
N. Y., deal	6.00 to 6.50

BUSHELING

Buffalo No. 1	8.00 to 8.50
Chicago, No. 1	7.00 to 7.50
Cinn., No. 1 dl.	6.75 to 7.25
Cinn., No. 2	4.00 to 4.50
Cleve., No. 2	6.00 to 6.50
Det., No. 1 new deal.	5.50 6.00
St. L., No. 1	6.00 to 6.50
Val. new No. 1	9.00 to 9.50

MACHINE TURNINGS

Birmingham	5.00 to 5.50
Boston, dealers	1.00 to 1.25
Buffalo	4.75 to 5.00
Chicago	3.75 to 4.25
Cinn., deal.	4.50 to 5.00
Cleveland	5.25 to 5.50
Detroit	3.00 to 3.50
Eastern Pa.	5.00 to 6.00
N. Y., deal.	2.00 to 2.50
Pittsburgh	6.50 to 7.00
St. Louis	3.50 to 4.00
Valleys	6.00 to 6.50

BORINGS AND TURNINGS For Blast Furnace Use

Boston	1.00 to 1.25
Buffalo	5.50 to 6.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.25 to 6.75
Detroit, deal.	3.50 to 4.00
Eastern Pa.	5.00 to 6.00
N. Y., deal.	2.00 to 2.50
Pittsburgh	6.75 to 7.25

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	5.00 to 5.50
Boston, chem.	7.00 to 8.00
Boston, deal.	1.00 to 1.25
Buffalo	5.50 to 6.00
Chicago	3.50 to 4.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.25 to 6.75
Detroit, deal.	3.50 to 4.00
Eastern Pa.	5.00 to 6.00
E. Pa., chem.	13.00
N. Y., deal.	2.00 to 3.00
Pittsburgh	6.75 to 7.25
St. Louis	5.00 to 5.50

PIPE AND FLUES

Cinn, deal.	7.00 to 7.50

RAILROAD GRATE BARS

Buffalo	6.50 to 7.00
Chicago, net	6.00 to 6.50
Cincinnati	5.50 to 6.00
Eastern Pa.	7.50 to 8.00
N. Y., deal.	5.00 to 5.50
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, deal	5.00 to 5.25
Buffalo	8.00 to 8.50
Cleve. ov. 10 in.	7.00 to 7.50
Detroit	5.75 to 6.25

FORGE SCRAP

Boston, del.	5.00 to 5.25
Chicago	11.50 to 12.00
Eastern Pa.	10.00

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	8.75 to 9.25

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	8.50 to 9.00
Chi., steelworks	7.50 to 8.00
Cleveland	7.50 to 8.00
Eastern Pa.	9.00 to 10.00
Pittsburgh	8.75 to 9.25
St. Louis	7.00 to 7.50

STEEL CAR AXLES

Birmingham	12.00 to 12.50
Boston, ship. pt.	11.00 to 12.00
Buffalo	15.50 to 16.00
Chicago	13.45 to 14.00
Eastern Pa.	18.50 to 19.50
St. Louis	12.50 to 13.00

SHAFTING

Bos., ship. pt.	10.00 to 10.50
Chicago	9.55 to 10.10
N Y., deal.	12.00 to 13.00
St. Louis	10.25 to 10.75
E. Penna.	18.00

CAR WHEELS

Birming., iron	8.00 to 9.00
Boston, iron	14.00 to 14.50
Buffalo, iron	11.00 to 11.50
Buffalo, steel	12.00 to 12.50
Chicago, iron	9.25 to 9.75
Chil. rolled steel	11.00 to 11.50
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	13.00
E. Pa. iron	12.50 to 13.00
Pitts., iron	11.50 to 12.00
Pitts., steel	13.00 to 13.50
St. Louis, iron	7.00 to 7.50
St. Louis, steel	10.00 to 10.50

NO. 1 CAST SCRAP

Birmingham	9.00 to 9.50
Buffalo (mach.)	9.75 to 10.25
Boston, textile	10.00 to 10.50
Chicago, mach.	9.80 to 10.35
Chi., railroad	8.70 to 9.25
Chicago, agri.	8.40 to 8.95
Cinn., mach. cup., gross	12.25 to 12.75
Cleve. cupola	11.50 to 12.00
Det., net deal.	8.25 to 8.75
E. Pa. cupola	12.50 to 13.00
N. Y. cup. deal.	7.50 to 8.00
N. Y., del. local foundries	12.00
Pitts., cupola	11.50 to 12.00
San Fran., del.	13.50 to 14.00
Seattle	7.50 to 8.00
St. L. No. 1 ma.	9.00 to 9.50
St. L. No. 1	8.50 to 9.00

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast	11.50 to 12.50
Buffalo, break	6.50 to 7.00
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.00 to 6.50
Eastern Pa.	10.00 to 11.00
N. Y. No. 1 dl.	7.00 to 7.50
N. Y. break. dl.	6.50 to 7.50
Pittsburgh	8.50 to 9.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	10.50 to 11.00
Chicago, agri.	9.00 to 9.50
Chicago, R. R.	9.50 to 10.00
Cinn., R. R. dl.	11.00 to 11.50
Cinn., agri., dl	1100 to 1150
Cleveland, rail	11.50 to 12.00
Det. auto deal.	10.50 to 11.00
St. Louis, rail	8.00 to 8.50

RAILS FOR ROLLING 5 feet and over

Birmingham	10.50 to 11.00
Boston	7.50 to 8.00
Buffalo	10.00 to 10.50
Chicago	11.00 to 11.50
Eastern Pa.	11.50 to 12.00
New York	7.75 to 8.25
St. Louis	10.25 to 10.75

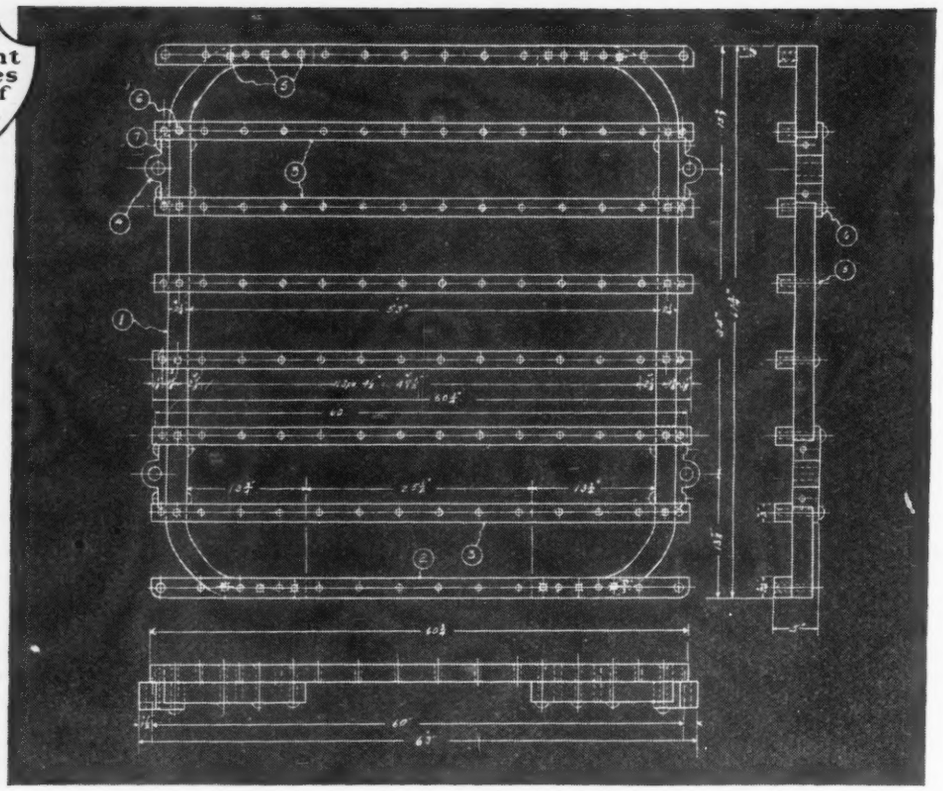
LOCOMOTIVE TIRES

Chicago, cut	11.50 to 12.00
St. L., No. 1	10.50 to 11.00

LOW PHOS. PUNCHINGS

Chicago	10.75 to 11.25
Buffalo	13.50 to 14.00
Eastern Pa.	14.50 to 15.00
Pittsburgh	14.50 to 15.00

№ 52
Pickling Equipment that passes the test of service



Detail of rolled Monel Metal pickling rack illustrated below.

MONEL METAL *racks* PROTECT *the quality of* Porcelain Enameling Sheets...

SINCE a clean, uniform surface, free of scale, flaws and copper is essential to high-grade porcelain enameling, you can readily understand why Monel Metal is the accepted material for pickling equipment among modern rolling mills producing steel sheets for porcelain enameling.

These mills have found that sheets, stampings and other enamel forms, processed in Monel Metal equipment, insure a higher quality finished product...an enamel coat that adheres firmly. Due to Monel Metal's high corrosion-resistance, the danger of scaly deposits and copper flash is minimized.

They have also found that Monel Metal equipment stands up longer. Its corrosion-resistance, steel-like strength and uniform rolled structure give this high Nickel alloy remarkable durability. There are many instances where Monel Metal pickling equipment is still on the job after many years of trouble-free service.

Monel Metal is adaptable to the most highly specialized types of pickling equipment. It is available in all standard shapes and forms which can be readily fabricated to meet individual specifications.

When you plan to purchase new processing equipment, remember that "Nickel Alloys Perform Better Longer"—and that Monel Metal is two-thirds Nickel.

Rolled Monel Metal pickling racks designed and constructed at the Huntington, W. Va., works of The International Nickel Company, Inc., for a prominent Ohio sheet steel mill. This mill recently installed 28 new Monel Metal racks of this general type to improve the finished surface of steel sheets for the stamping and enameling trade.

A HIGH NICKEL ALLOY

MONEL METAL

NICKEL ALLOYS PERFORM BETTER LONGER

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N.Y.

in this territory, demand for foundry scrap is confined to occasional spot cars. Steelworks melters are closely limiting shipments, although their melt of cold metal is relatively higher since pig iron consumption has been cut down. Virtually all scrap grades are nominal as important transactions are lacking.

Boston—Except for half a dozen lines, the scrap market remains in the doldrums. Several grades worked to lower prices in the past week, with the American Steel & Wire Co. at Worcester scaling down prices paid for No. 1 heavy melting steel as well as bundled skeleton, both of which lines they have been taking for some time. They are now paying $7.50 a ton, delivered, for heavy melting steel and $6.50 for bundled skeleton. There was a small tonnage of pipe sold to a Pennsylvania interest in the past week, bringing $5.00 to $5.25 a ton.

New York—Shipments have been held up by several eastern Pennsylvania mills. While some No. 1 and No. 2 steel continues to move to the Buffalo district by barge, the volume is smaller. Mills in general are not buying. Prices are weak. Dealers are paying less than $2 for turnings and borings. Stove plate is also off $1 per ton. Railroad offerings are reported to be heavy. Low prices of unprepared scrap have slowed up collections.

Philadelphia—Numerous reductions are noted in prices of steel and iron scrap, following further light trading. Sales include several hundred tons of heavy breakable cast for Florence, N. J., at $10, delivered, a few hundred tons of No. 1 steel for Sparrows Point, Md., at $8.50, delivered, and a small tonnage of No. 2 steel for Pencoyd, Pa., at $7.50. Principal consumers at Coatesville, Pa., and Claymont, Del., continue the ban on shipments.

Bids were opened June 3 by the Philadelphia navy yard on approximately 1525 tons of ferrous and 500 tons of nonferrous scrap.

Buffalo—Offers for steel and iron scrap have again been reduced here by the largest buyer. The new offered prices are $8 for No. 2 steel and $9.50 for No. 1, in each case the lowest quotation in many years.

Pittsburgh—Prices of steel and iron scrap continue weak and several grades are quotably lower in the face of poor demand. Heavy melting steel is off 25 cents at $10.50 to $11. Blast furnace material has sold at $7 to $7.25, a decline of 50 cents from the recent market. Steel specialties and low phosphorus grades are easier as a result of weakness in heavy melting steel. Prices now are regarded as at the bottom level but consumers still show little interest.

Cleveland—The situation in iron and steel scrap shows little change. Shipments to mills continue on a moderate scale. An order recently placed by one interest has been practically filled. Demand for foundry grades shows further curtailment with seasonal recession in activity. Quotations remain unchanged. A few odd carlots of scrap are moving out of town, chiefly to Lowellville and Warren, O. Quotations have dropped further in the valley district with steel now $10 to $10.50 and compressed sheets $9.50 to $10.

Detroit—Further declines of 25 to 50 cents per ton have been registered, several in steel and iron scrap grades, partly because of weakness in consuming markets.

Cincinnati—Quotations on iron and steel scrap are nominally unchanged. Although new buying is for light tonnage, dealers hope recent demand will steady prices.

St. Louis—Finding themselves short of several grades of scrap with which to fill orders, dealers in St. Louis have advanced prices, the first advance here in months. Steel car axles and steel angle bars have been raised 50 cents a ton to $12.50 to $13 and $8.50 to $9, respectively. No. 1 select heavy melting steel and frogs, switches, etc., are also firm at $9 to $9.50.

Birmingham, Ala—All prices on steel and iron scrap continue weak, buyers fixing prices practically but not buying. The aggregate tonnage moving is light. Consumers are accumulating no stock and purchase as needs arise.

Toronto, Ont.—Demand for foundry and malleable scrap showed little special activity during the week. The Monday holiday cut into business although the last couple of days brought forward a few fair orders.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axle	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Coke

Eastern Makers Reduce By-Product Foundry Fuel Prices—Connellsville Market Easy

COKE PRICES, PAGE 86

Pittsburgh—Beehive coke demand is fairly steady, although still tending downward. Foundry requirements are declining slowly while furnace coke shipments are little changed. The spot market for the latter usually is $2.40 to $2.50 for standard grades, with low sulphur material ranging down to $2.10 Beehive foundry coke prices are steady.

New York—Following a reduction of 50 cents in by-product foundry coke prices in the New England district, similar grades have been reduced 30 cents to $8.70 to $9.10, delivered, Newark, N. J. The price delivered at Philadelphia has been reduced 25 cents to $8.75.

Certain sellers of high-grade beehive foundry coke are opening books for second half at $4.85, Latrobe, Pa., and have taken some business at this figure. Better than standard grades, although not the highest quality have been offered at $4.50, and according to some reports, at slightly less. Standard grades of beehive foundry coke are around $3.25, Connellsville, Pa. Standard beehive furnace coke is $2 to $2.25, Connellsville.

Boston—By-product foundry coke has been reduced 50 cents a ton to $10.50, delivered, New England, the first reduction in several years.

Cincinnati—Specifications for by-product foundry coke were somewhat heavier during May. Demand in this district is spotty.

Birmingham, Ala—An exceptional shipment of coke, 4000 tons by rail and water from Birmingham to Boston, is nearing completion by the Semet-Solvay interests. Consumption here is lagging and prices are unchanged.

Pacific Coast

Hetch Hetchy Welded Steel Pipe Tonnage Goes to Coast Fabricator, Involving 40,000 Tons Steel Plates—Montana Gas Pipe Line Also Awarded—Wood Pipe Claims Win Contracts

San Francisco—(*By Air Mail*)—Award of 40,000 tons of plates for the Hetch Hetchy pipe line project, San Francisco, and placing of a number of reinforcing steel bar projects, were the high lights of activity in the Pacific Coast iron and steel markets, this week. Most new inquiries continue to involve tonnages for public work projects.

Bars, Plates and Shapes

Movement of mild steel bars is limited to small lots for immediate shipment, while prices hold around 2.10c, c.i.f. Demand for concrete bars remains fairly active and awards this week aggregated 2652 tons, the largest weekly total since early in February. The total for the year is now 25,009 tons as compared with 19,661 tons for the corresponding period in 1930. Among the larger lettings were 242 tons for the Kress store, Sacramento, booked by Truscon Steel Co.; 350 tons for an auto sales building in Los Angeles and 205 tons for the Hetch Hetchy pipe line project, San Francisco, both of the latter going to unknown companies. Bids have been opened on 268 tons for a bridge over the Santa Clara river in southern California and on 614 tons for a sewage treatment plant in Phoenix, Ariz. Prices in the San Francisco district on out-of-stock material remain unchanged at 2.60c, base, on carload lots. Los Angeles quotations hold at 2.50c.

Western Pipe & Steel Co., San Francisco, secured the subcontract, through the Youdall Construction Co., for the fabrication of 40,000 tons of 58 to 70-inch welded steel pipe for the Hetch Hetchy pipe line. This work will be done in its plant at South San Francisco. Awards of plates so far this year totaled 104,357 tons, compared with 23,812 tons for the same period last year. Prices are weak at 2.05c, c.i.f.

Awards of structural shapes aggregated 2249 tons, bringing the total for the year to 48,608 tons as compared with 40,015 tons for the corresponding period in 1930. The Kyle Steel Construction Co. took 100 tons for emergency outlet gates for the Hoover Dam project in Colorado. No new inquiries of importance developed during the week. An award is expected to be made next week on 800 tons for the Oakland post office. Bids have been opened on 1715 tons of shapes and 300 tons of H columns for a bridge over the Santa Clara river, Ventura county, Calif. Plain shapes range between 2.05c and 2.15c, c.i.f.

Other Finished Material

The absence of large inquiries for cast iron from municipalities this year has brought total bookings for the year considerably below that of last year. To date 33,236 tons have been placed, compared with 44,085 tons for the same period a year ago. Awards this week were limited to two projects of more than 100 tons. Glendora, Calif., placed with an unknown company 135 tons of 6 to 12-inch pipe. An unknown company also secured 136 tons of 4 to 10-inch pipe for the national guard training camp near San Luis Obispo, Calif. Bids have been opened on 199 tons of 6-inch pipe for Calistoga, Calif., and on 2100 tons of 12-inch centrifugal pipe for Los Angeles.

Movement of sheets has shown no improvement, consumers continuing to order for immediate requirements only. Prices remain unchanged at 2.50c, c.i.f. for No. 10 gage blue annealed sheets, at 3.00c for No. 24 gage black sheets and at 3.50c, c.i.f., for No. 24 gage galvanized sheets.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Pipe Line Is Let

Seattle—The largest job involving steel awarded in the Northwest this year has been taken by Winston Bros., Minneapolis, who have the contract to construct approximately 225 miles of gas pipe line in Montana. There were three bidders and while the figures were not made public, previous estimates of the cost ranged from $12,000,000 up. The line will be laid from the Cut Bank field in northern Montana to Butte and Anaconda.

S. S. Nichols, general superintendent of the Phoenix Utility Co., which awarded the contract for the Montana Power Co., announced that work will begin about June 1 and it is expected to complete it early in the fall. The amount of steel is not known here.

Few important projects, involving steel, are up for figures in the Pacific Northwest, the largest being the Marine hospital, Seattle, which will require 1000 tons of reinforcing steel and 100 tons of shapes. General contract has been awarded N. P. Severin Co., Chicago, at $1,269,000. Bids for the superstructure of the Seattle postoffice are expected to be called about July 10.

Bars, Plates and Shapes

Both merchant and concrete bars are moving slowly. Local mills report some business in car lots but no large awards. Northwest Steel Rolling Mills, Seattle, booked 275 tons for the John Rogers High school, Spokane, and 100 tons for two state highway projects.

Agitation in behalf of wood stave pipe is becoming more pronounced in the Pacific Northwest where the lumber industry is zealously seeking business. This condition makes it more difficult for steel and more than one desirable job has gone wood, due to local pressure. No large projects involving plates are up for figures. Puget Sound Machinery Depot, Seattle, has booked an order for a number of tanks in the Seattle Ford assembly plant, calling for 200 tons of plates.

Demand for shapes is not active and fabricating plants have few jobs up for figures. Awards this week were in less than 100-ton lots. Business pending is of small proportions and includes 220 tons of shapes and 63 tons of concrete bars for the Hellgate bridge, Lane county, Oreg., general contract to Lindstrom & Feigenson, Portland, Oreg.

Finished Materials

The wholesale jobbing business in the Pacific Northwest has developed into guerilla warfare as price schedules have practically been abandoned and the situation declared open. Reduction in wholesale prices early this month has brought no new business.

Youngstown Cuts Dividend

Youngstown Sheet & Tube Co., directors June 2 reduced the annual dividend of $4 on common stock to $2 by declaring a quarterly dividend of 50 cents a share, payable July 1 to stock of record June 13.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del., 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk.	Gal.
½	58	44½	½	23	5
¾	62	50½	¾	28	11
1—3	64	52½	1—1¼	31	15
			1½—2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7—8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

½	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7—8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized. Direct mill shipments, base minus 5 and 2½.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f. o. b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill discounts

Random lengths over 5 ft. 55%
Selected lengths, 1—18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$35.00 to 36.00
Four-inch, Birmingham .... 39.00 to 40.00
Four-inch, Chicago ..... 45.00 to 47.00
Six to 24-inch, Chicago..... 42.00 to 44.00
Six-inch and over, N. Y..... 34.50 to 36.50
Four-inch, New York ..... 39.50 to 40.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.00c
Chattanooga	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.75c
Detroit	2.85c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.60c
Portland	3.15c
San Frans.	2.40c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.15c
Cleveland	2.10-2.25c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.00c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	2.60c to 2.85c
San Fran.	3.65c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	3.70c
Chicago	3.80c
Cincinnati	3.90c
Cleveland	3.60c
Detroit	3.50c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.40c
Pitts.**	3.30c
Portland	4.50c
San Fran.	4.15c
Seattle	4.25c
St. Louis	3.95c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.40c
Chicago (local del.)	4.35c
Chicago (outside)	4.35-4.60c
Cincinnati	4.40c
Cleveland	4.00c
Detroit	4.00c
Houston	5.40c
Los. Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	3.85c
Pitts.**	3.90c
Portland	5.00c
San Fran.	4.65c
Seattle	4.75c
St. Louis	4.40c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.35c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	2.95c
Portland	3.50c
San Fran.	3.75c
Seattle	3.50c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.55c
Det. No. 14 & lighter	3.65c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	3.60c
Seattle	4.90c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.50c
St. Paul (a)	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 50c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	6.15c
Cincinnati	6.10c
Clev. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.

EFFECTIVE GAS WASHING *at low cost . .*

THE McKee Two-Stage Gas Washer, consisting of two standard McKee Units in the bottom with a hurdle arrangement, similar to a tower washer superimposed, is a recent development of the engineers of the McKee organization.

It accomplishes primary cleaning of all the blast furnace gas at minimum first cost —and with low power and water consumption. Moreover, it effectively cools the gas.

This new type gas washer is especially adapted to prepare the gas for secondary fine cleaning in disintegrators or precipitators for use in small checker stoves. The remainder of the gas is left in good condition for consumption at the boilers.

Layouts and estimates on request

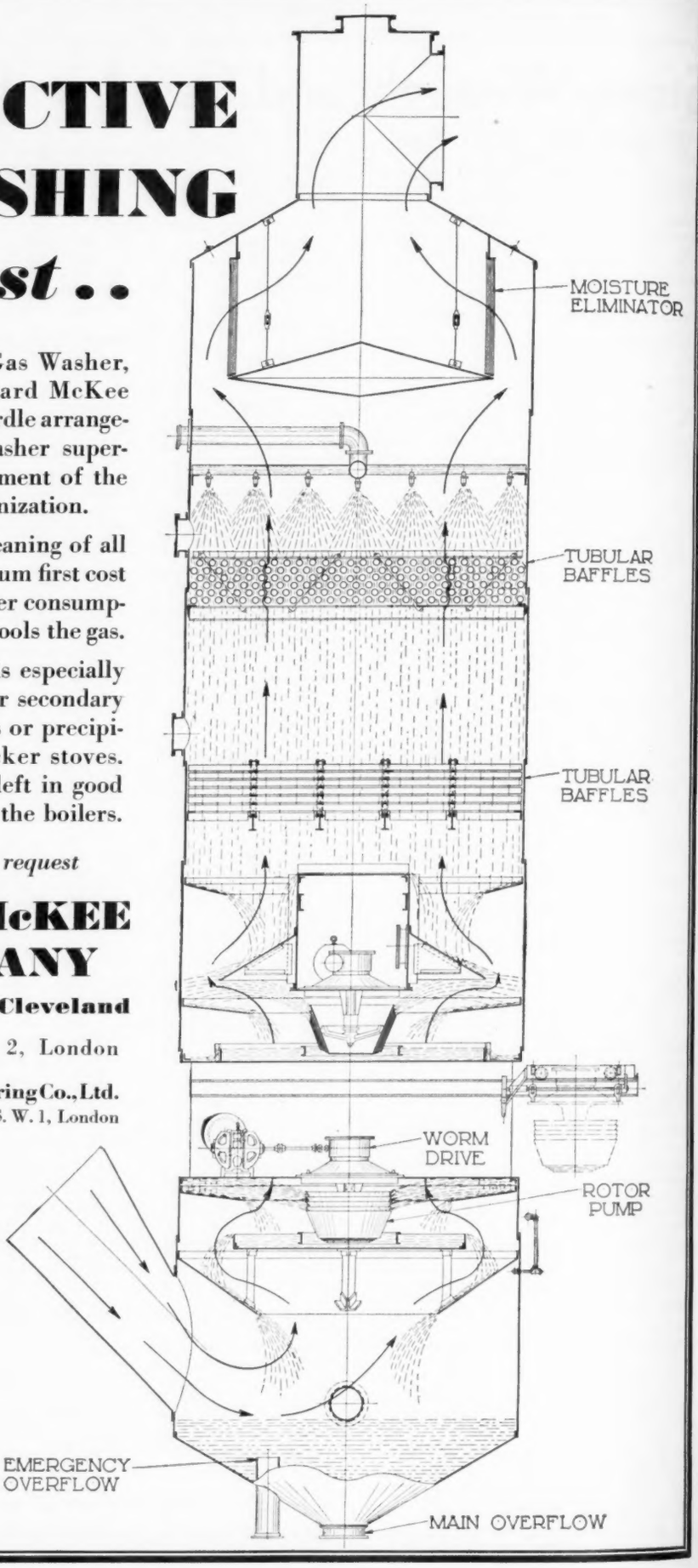
ARTHUR G. McKEE AND COMPANY

2422 Euclid Avenue · Cleveland

Bush House, Aldwych, W. C. 2, London

The Whessoe Foundry & Engineering Co., Ltd.
Darlington, England - 25 Victoria St., S. W. 1, London

Twenty-five years of specific engineering application to the improvement of Blast Furnace and Steel Plant efficiency. World-wide recognition for devices and equipment that reduce costs and losses, safeguard employes, rationalize operations and increase production.



Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 8.50c, Conn., for copper

Sheets	
Yellow brass (high)	15.87½
Copper, hot rolled	18.37½
Lead, full sheets (cut ½c more)	7.75
Zinc sheet (100-lb. base)	8.75
Tubes and Pipes	
Seamless yellow brass (high)	20.75
Seamless copper	20.87½
Rods	
Yellow brass (high, full turnings)	14.12½
Naval brass	15.12½
Anodes	
Copper, untrimmed	15.87½
Wire	
Yellow brass (high)	16.37½

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	5.00 to 5.25
Chicago	5.25 to 5.50
Cleveland	5.00 to 5.50
St. Louis	5.75
Heavy Yellow Brass	
New York	3.25 to 3.50
Heavy Copper and Wire	
New York	6.25 to 6.50
Boston	5.75 to 6.00
Chicago	5.25 to 5.75
Cleveland	5.25 to 5.75
St. Louis	6.00 to 6.25
Red Brass Borings	
New York	4.75 to 5.00
Yellow Brass Tubing	
Cleveland	3.00 to 3.50
Light Copper	
New York	5.25 to 5.50
Chicago	4.75 to 5.25
Cleveland	4.50 to 5.00
St. Louis	5.50
Light Brass	
Boston	2.25 to 2.50
Chicago	2.75 to 3.25
Cleveland	2.00 to 2.50
St. Louis	3.00 to 3.25
Zinc	
New York	1.00 to 1.25
Cleveland	0.87½ to 1.00
St. Louis	1.25
Aluminum	
Clippings, soft, Cleveland	11.50 to 12.50
Clippings, hard, Cleveland	8.50 to 9.50
Borings, Cleveland	4.50 to 5.00
Mixed cast, Cleveland	4.50 to 5.00
Mixed cast, Boston	4.00 to 4.25
Mixed cast, St. Louis	4.50

Secondary Metals

Remelt aluminum No. 12	9.00 to 10.00
Brass ingots, 85-5-5-5	8.37½

Metals

Copper and Tin Prices Fall to New Low Levels—Light Buying Reflected—Zinc Is Steady

New York—New low prices continue in nonferrous metals. Weakness reflects extremely light demand and lack of further curtailment in production. Copper and tin have dropped but lead and zinc have been unchanged.

Copper wire prices have been cut twice. Other copper and brass mill products have been lowered to a basis of 8.50c for copper. New business in all mill products is light, and shipments on old orders have fallen off.

Copper—After several days of a firmer situation a week ago, shaded metal has reappeared. More metal has been offered at 8.50c than wanted, and so it is thought in the market that still further reductions are pending. It is widely accepted that the price is likely to go substantially lower unless news of curtailment is quickly forthcoming. Reports indicate that the industry is waiting for a price which will automatically balance supply against demand.

Zinc—Prime western has been available at 3.25c for about a week. A little more stability has been shown, not because of producers' resistance to weakness, but because the price is nominal in the absence of test demand from consumers. The ore market has been firmer at $20 a ton, and this is an influence against further price cutting on metal.

Tin—New low prices have attracted buyers at times but business for the week as a whole has not been large. Statistics for May were weaker than expected, with an increase of 2769 long tons in the world's visible supply to a new high of 51,231. To this should be added several thousand tons of "carry-over" at the Straits and in unregistered warehouses here. United States deliveries last month were 5505 tons, the smallest with one exception in more than a year. Even these deliveries are believed larger than actual consumption. Large shipments from the Straits are expected this month, so curtailment is not yet nearly so great as the fall in consumption.

Lead—New business has been extremely light, mostly in small lots for prompt shipment, but prices are unchanged.

Aluminum—New business is quiet. Prices are steady.

Coke By-Products Moving Well; Sulphate Lower

New York—Sulphate of ammonia prices are lower, with little export buying. Domestic demand is seasonally good, but not active. Toluol demand is holding up. Stocks are lower as output continues light. Sales generally are made at 29.00c.

Coke By-Products

	Spot
Per Gallon, Producers' Plants, Tank Lots	
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27 to 0.29
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.675 to $1.775

Benzol is moderately active. Xylol and solvent naphtha are unchanged in price and shipments, although some higher refined products have been advanced. Spot movement of naphthalene is active. Prices are firm and unchanged. Phenol shows a slight improvement, the resin industry taking more material.

Oakley Valve & Foundry Co., 60 Ferguson St., Newark, N. J. has moved to its new plant at 17-21 Newark Way, Maplewood, N. J.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
May 27	8.60	8.87½	8.50	22.92½	23.12½	3.75	3.60	3.27½	22.90	6.37½	35.00
May 28	8.50	8.87½	8.37½	22.50	22.70	3.75	3.60	3.25	22.90	6.37½	35.00
May 29	8.50	8.87½	8.37½	22.62½	22.87½	3.75	3.60	3.25	22.90	6.32½	35.00
May 30—Holiday.											
June 1	8.50	8.62½	8.37½	22.40	22.70	3.75	3.60	3.25	22.90	6.30	35.00
June 2	8.50	8.62½	8.25	22.40	22.75	3.75	3.60	3.25	22.90	6.30	35.00

Europe

Continental Steel Prices Reach Low Records—Little Response to British Adjustments

London—(*By Radio*)—Steel prices on the Continent continue to fall, reaching new low records in many instances. Manufacturers are selling at a loss. Heavy steel made in France is competing in Belgium.

The business depression on the Continent and in Great Britain is unrelieved. Following the recent reduction of galvanized sheet prices, some orders have been received by British mills from Central and South America and the West Indies. Belgian sheet makers are competing with British mills in India. Trade with Australia shows some signs of increasing.

Prices of black sheets have been reduced 10 shillings ($2.43) a ton by mills in Scotland. Sentiment in the Midland pig iron market has been improved by price reductions, but buying continues spotty.

British Steelmakers Face Prewar Prices on Bars

London—Conditions in the European iron and steel export market again are seriously depressed. Not only are inquiries severely restricted in volume, but export prices now are at an extremely low level. Merchant bars have been offered as low as £3 12s 6d ($17.20) per ton, f.o.b. Antwerp. This is about the lowest level reached since the war, and, in fact, if one takes account of present values, the price at which merchant bars now are changing hands is lower than in prewar times. At this juncture it is interesting to note that toward the end of 1928 and the beginning of 1929, merchant bars reached their peak at £6 3s ($26.75); in January this year they were £4 3s ($18.10); in February they were about £3 18s 9d ($17.15), and in March and April about £3 17s ($18.80); now they are £3 12s 6d ($17.20).

In Great Britain export markets for iron and steel are almost lifeless. Competition from the Continent recently was less noticeable, when prices seemed to have a tendency to become firmer, but it is to be expected that owing to the present level of Continental prices and the lack of orders received on the other side, further efforts will be made to capture business on the British market.

Tariff Move Fails

Efforts by the National Federation of Iron and Steel Manufacturers, and also by leaders of the industry, to influence the government to impose a tariff on foreign iron and steel have been without result, as the present government continues to favor a free trade policy. Under the circumstances it is characteristic that among the proposals put forward by the Iron and Steel Trades confederation, a body which includes 59,000 trade union members, is a demand for a protective tariff to safeguard the home industry. It is pointed out that unemployment in the iron and steel industry has doubled in the last twelve months, and that today over 45 per cent of all the workers are idle. In the meantime, prices of British steel continue to be substantially higher than Continental prices, due in particular to high labor costs obtaining in Great Britain, and this naturally makes competition extremely difficult for British steelmakers.

Some Concerns Withdraw

On the Continent conditions are far from being satisfactory and it now is apparent that a serious hitch has occurred with respect to orders which, according to previous reports, had been obtained by German makers for Soviet Russia. As a result, German makers again are competing on foreign markets, although a number of concerns, not only in Germany, but also in Belgium, are withdrawing from the market, as they will not accept business at the present low price level. Practically all lines are depressed. Beams now are quoted at £3 6s 6d ($16.20), against £3 13s ($17.70) at the beginning of the year, and 5-millimeter plates now are £4 4s ($20.40), against £4 14s 6d ($22.90) in January.

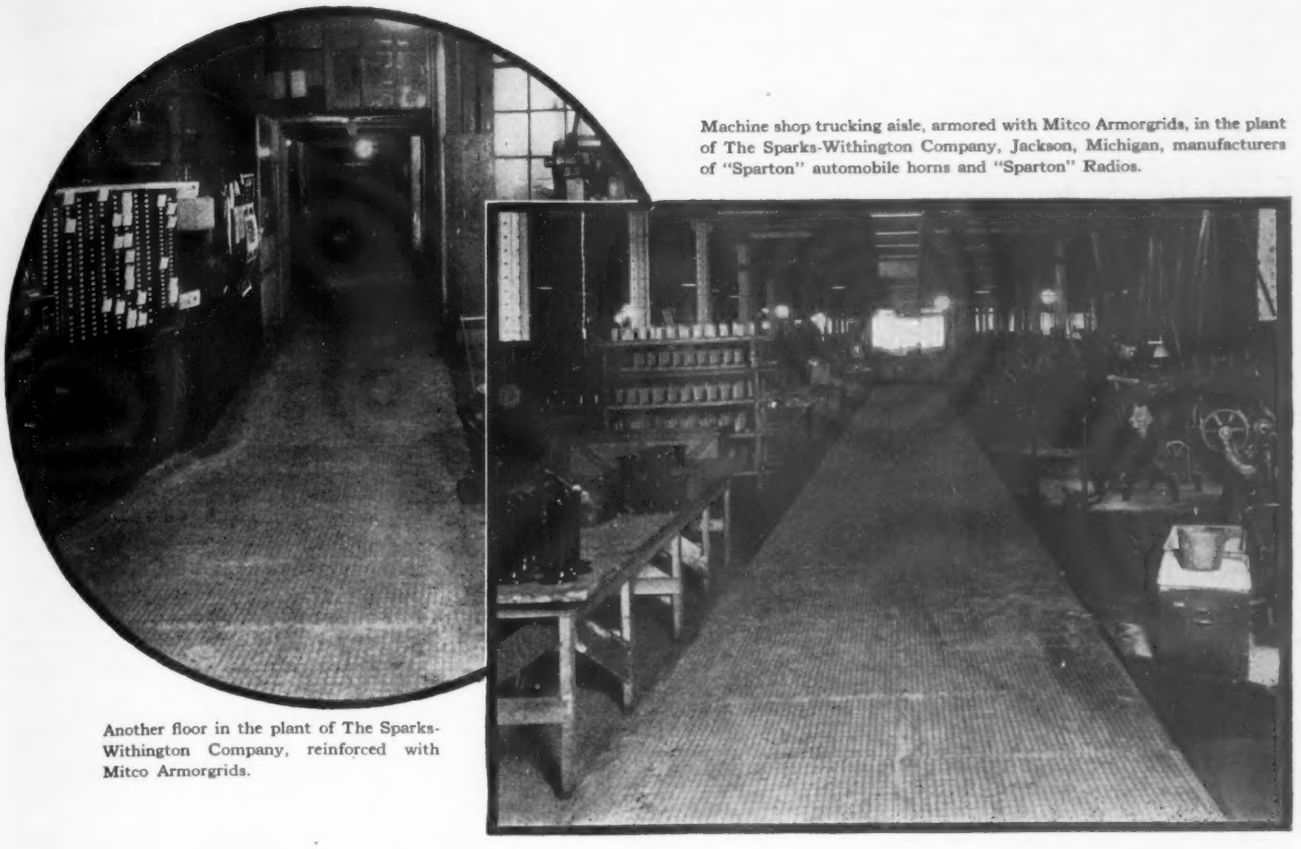
Generally speaking, there are no signs of definite revival of trade, and consequently considerable importance is attached to negotiations now being carried on between the representatives of the European steel en-

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, June 1	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.24	2 18 6*	$11.81	2 8 6	$11.81	2 8 6	$12.18	2 10 0
Basic-bessemer.....	14.61	3 0 0†	11.57	2 7 6	11.57	2 7 6	13.39	2 15 0
Hematite, Phos. .02-.05	15.83	3 5 0	.....	.....	.....	.....	17.05	3 10 0
SEMIFINISHED STEEL								
Billets.....	$26.18	5 7 6	$15.34	3 3 0	$15.34	3 3 0	$15.83	3 5 0
Wire rods.....	41.40	8 10 0	24.35	5 0 0	24.35	5 0 0	24.35	5 0 0
FINISHED STEEL								
Standard rails.....	$40.18	8 5 0	$31.66	6 10 0	$31.66	6 10 0	$31.66	6 10 0
Merchant bars.....	1.63c	7 10 0	.78c	3 10 6	.78c	3 10 6	.81c	3 14 0
Structural shapes.....	1.68c	7 15 0	.72c	3 5 6	.72c	3 5 6	.74c	3 7 0
Plates.....	1.79c	8 5 0	.91c	4 3 0	.91c	4 3 0	.99c	4 10 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.84c	8 7 6
Sheets, gal., 24 ga. corr.	2.28c	10 10 0	2.20c	10 0 0	2.20c	10 0 0	2.31c	10 10 0
Bands and strips.....	2.06c	9 10 0	.94c	4 5 0	.94c	4 5 0	.96c	4 7 6
Plain wire, base.....	2.06c	9 10 0	1.08c	4 18 6	1.08c	4 18 6	1.10c	5 0 0
Galvanized wire, base..	2.39c	11 0 0	1.38c	6 5 0	1.38c	6 5 0	1.38c	6 5 0
Wire nails, base.....	2.39c	11 0 0	1.10c	5 0 0	1.10c	5 0 0	1.10c	5 0 0
Tin plate, box 108 lb...	$ 3.65	0 15 0	.....	.....	.....	.....	$ 8.29	1 14 0

			French Francs		Belgian Francs		Renten Marks	
Domestic Prices at Works or Furnace—Last Reported								
Fdy. No. 3 Pig Iron**	$14.24	2 18 6	$11.96	305(2)	$12.83	460	$18.53	78
Basic pig iron.....	14.61	3 0 0	12.74	325(1)	11.72	420	20.31	85.50
Furnace Coke.....	2.92	0 12 0	5.68	145	5.16	185	5.08	21.40
Billets.....	26.18	5 7 6	19.20	490	17.72	635	26.25	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37c	127
Merchant bars.....	1.68c	7 15 0	.86c	480	.86c	660	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.85c	655	1.35c	125
Plates.....	1.95c	9 0 0	1.26c	700	.99c	765	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.21c	1,225	1.89c	1,450	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.57c	1,425	2.54c	1,950	3.56c	330
Plain wire.....	2.06c	9 10 0	1.85c	1,025	2.08c	1,600	2.24c	207
Bands and strips.....	2.06c	9 10 0	1.10c	610	1.39c	1,075	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.



Machine shop trucking aisle, armored with Mitco Armorgrids, in the plant of The Sparks-Withington Company, Jackson, Michigan, manufacturers of "Sparton" automobile horns and "Sparton" Radios.

Another floor in the plant of The Sparks-Withington Company, reinforced with Mitco Armorgrids.

Expect Much More from the Armored Floor
You'll Get It With MITCO ARMORGRIDS

YOU HAVE a right to expect some degree of longer life and lower maintenance costs from an armored floor, platform, ramp or driveway. But getting the maximum degree of benefit from your investment in armoring requires selection of the proper type of armoring . . . and that means the high-strength, panel-type, rectangular-opening armoring . . . Mitco Armorgrids.

Made of heavy, rugged steel bars of exceptional tensile strength, Mitco Armorgrids are formed under hundreds of tons' hydraulic pressure into self-bracing panels that cannot flex or weave and thus cause cracking under loads and shocks.

In addition, Mitco Armorgrids have rectangular openings, into which the filling material flows easily and quickly, making each filled rectangle of maximum cross-sectional area and strength. There are no sharp fins or irregular-shaped sections of flooring material to chip and crack out. As there is no opening from one rectangle to another, cracks cannot develop through the structure.

Mitco Armorgrid construction assures the maximum benefit from your investment in flooring and armoring. The low cost of armoring with Mitco Armorgrids will surprise you. May we tell you about it, and send you a copy of the bulletin on Mitco Armorgrids? Write us today.

HENDRICK MFG. CO.
43 Dundaff Street, Carbondale, Pa.
New York Office, 15 John St.
'Phone: COrtlandt 7-2440

Baltimore, Md.; Birmingham, Ala.; Boston, Mass.; Charleston, W. Va.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Erie, Pa.; Hazleton, Pa.; Houston, Tex.; Indianapolis, Ind.; Los Angeles, Cal.; Montreal, Can.; Philadelphia, Pa.; Pittsburgh, Pa.; San Francisco, Cal.; Seattle, Wash.; Tulsa, Okla

Makers of Mitco Shur-Site Treads, Hendrick Perforated Metal Screens and Elevator Buckets, Hendrick Perforated Metal Grilles and Light and Heavy Steel Plate Construction.

HENDRICK MITCO GRATING

The open steel flooring with every advantage is Mitco Interlocked Steel Grating. 90% of its panel area is open, providing maximum light and ventilation. It is high in strength and rigidity; its surface is non-slipping; its construction is non-clogging. Specify Mitco wherever open steel flooring is required. Write for bulletin.

HENDRICK MITCO ARMORGRIDS

for longer life from concrete and cement floors, platforms, ramps and driveways

tente in the hope that this organization will at last be able to set up some kind of international syndicate which will enable prices to rise to a more economic level.

French Works Meet Loss

Luxemburg — The recent annual general meeting of Societe Metallurgique des Terres-Rouges brought out that the results of the year ending Dec. 31, 1930, were unfavorably influenced by the depression prevailing in the iron and steel markets and the dividend was reduced from 87.50 Belgian francs ($2.40) for 1929 to 50 francs ($1.40) per share.

The annual general meeting of Hauts-Fourneaux et Acieries de Steinfort also has been seriously affected by the industrial depression. Two blast furnaces and the electric steelworks had to be closed down and only one furnace stack and the foundry continue to operate. Output of the iron ore mines owned by the concern reached 411,204 metric tons, a decrease of 170,000 tons from the previous year, which is accounted for by the reduction in the output of pig iron. The year under review resulted in a loss of 1,567,290 Belgian francs ($43,500).

German Trade Off Sharply

Berlin—Exports of pig iron and ferroalloys from Germnay in March were 7612 metric tons, bringing the total for first quarter to 25,570 tons, compared with 83,407 tons in the first three months of 1930, a decrease of 69 per cent. Exports of other iron and steel products in March amounted to 360,940 metric tons, making a total of 1,042,080 tons for first quarter, against 1,363,233 tons in the corresponding period of 1930, a decrease of 23.6 per cent.

Imports of pig iron and ferroalloys in March were 8934 metric tons, making a total of 28,021 tons for first quarter, against 52,378 tons for the first three months of 1930, a decrease of 46.5 per cent. Imports of other iron and steel products in March were 84,135 metric tons, bringing the total for the first three months to 232,858 tons, compared with 310,925 tons for the first quarter of last year, a decrease of 25.2 per cent.

Belgium Fears Japanese And Indian Steel Inroads

Brussels—Belgian iron and steel export trade continues unsatisfactory, and anxiety is expressed for the future, owing to the tendency of such countries as Japan and India not only to reduce their purchases, but, in fact, to compete in certain lines, even in European markets. Recent reports from Germany have been to the effect that Japanese enamelware has made inroads in German territory, and, on the other hand, imports of Indian pig iron in certain European markets show signs of expanding. As a result of these conditions, a policy of reduction of output is deemed advisable, and yet a number of works are increasing their capacity of production, even in products for which it already is difficult to find an outlet.

The Usines de la Providence are about to restart a blast furnace stack which has undergone extensive repair and in France the Societe Lorraine Miniere et Metallurgique is modifying its plant to bring capacity of its four blast furnaces to 400 tons per day, which would result in an increase of the concern's output, which in 1930 reached 221,000 metric tons.

The pig iron market is calm. Trade in semifinished steel products is restricted and prices tend to fall. At the Charleroi iron and steel exchange on May 11 certain British importing firms offered to buy sheet bars at £3 5s ($15.75) per ton, f.o.b. Antwerp, but since that date it is reported that the French firm of Denain-Anzin has taken business at £3 4s ($15.50). Two-inch billets now are offered at £3 4s ($15.50), and 6-inch blooms at £3 1s ($14.80). The present price for normal-size beams is £3 6s 6d ($16.10), but hardly any business is passing. British sizes are quoted at £3 7s 6d ($16.35). The price of merchant bars has fallen off markedly, having reached the low level of £3 12s 6d ($17.55), but this low price does not seem to attract much business. Five-millimeter plates now are £4 5s ($20.55), and 3-millimeter sheets are £4 8s ($21.30).

There appear to be certain difficulties in the wire rod syndicate. The Belgian group has the option to withdraw from the syndicate June 30; this date has been postponed to July 31 to enable Belgian manufacturers to come to terms among themselves, but there are difficulties with respect to the important group of Sambre Escaut. Uncertainty regarding the future position of the wire rod syndicate makes it all the more difficult to organize a syndicate of wire product manufacturers, and the outcome remains obscure.

British Trade Gains

London—Exports of pig iron and ferroalloys from Great Britain in April declined from March but exports of other iron and steel products made a fair gain.

Imports of pig iron and ferroalloys in April gained over March while imports of other iron and steel products declined. Comparisons follow, in gross tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron and ferro-alloys	Other iron and steel	Pig iron and ferro-alloys	Other iron and steel
1928	9,935	231,390	37,895	317,210
1929	12,310	222,410	45,430	319,520
1930	26,010	216,355	26,445	236,715
1931				
Jan.	23,345	198,428	18,743	148,630
Feb.	20,836	156,220	13,840	129,685
March	22,777	187,690	15,836	154,453
April	26,101	167,289	13,707	174,158

French Coke Output Up

Paris—Production of coke at French collieries in March was 432,436 metric tons, compared with 397,964 tons in February, the total for first quarter being 1,254,189 tons, as against 1,251,656 tons in the corresponding quarter of 1930, which shows that the output this year was slightly above last year's figures for the period considered. Imports of coke have declined for the month and quarter. Comparative figures follow, in metric tons:

Mon. ave.	Production	Imports	Exports
1913	335,620	255,835	17,085
1928	366,660	447,330	34,810
1929	397,435	453,720	39,070
1930	421,235	380,460	27,505
1931			
Jan.	423,789	326,007	23,116
Feb.	397,964	330,094	27,836
March	432,436	351,534	23,099

British Output Down

London—Output of pig iron, steel ingots and castings in Great Britain in April showed a further decline, part being due to the Easter holidays. The comparison is as follows:

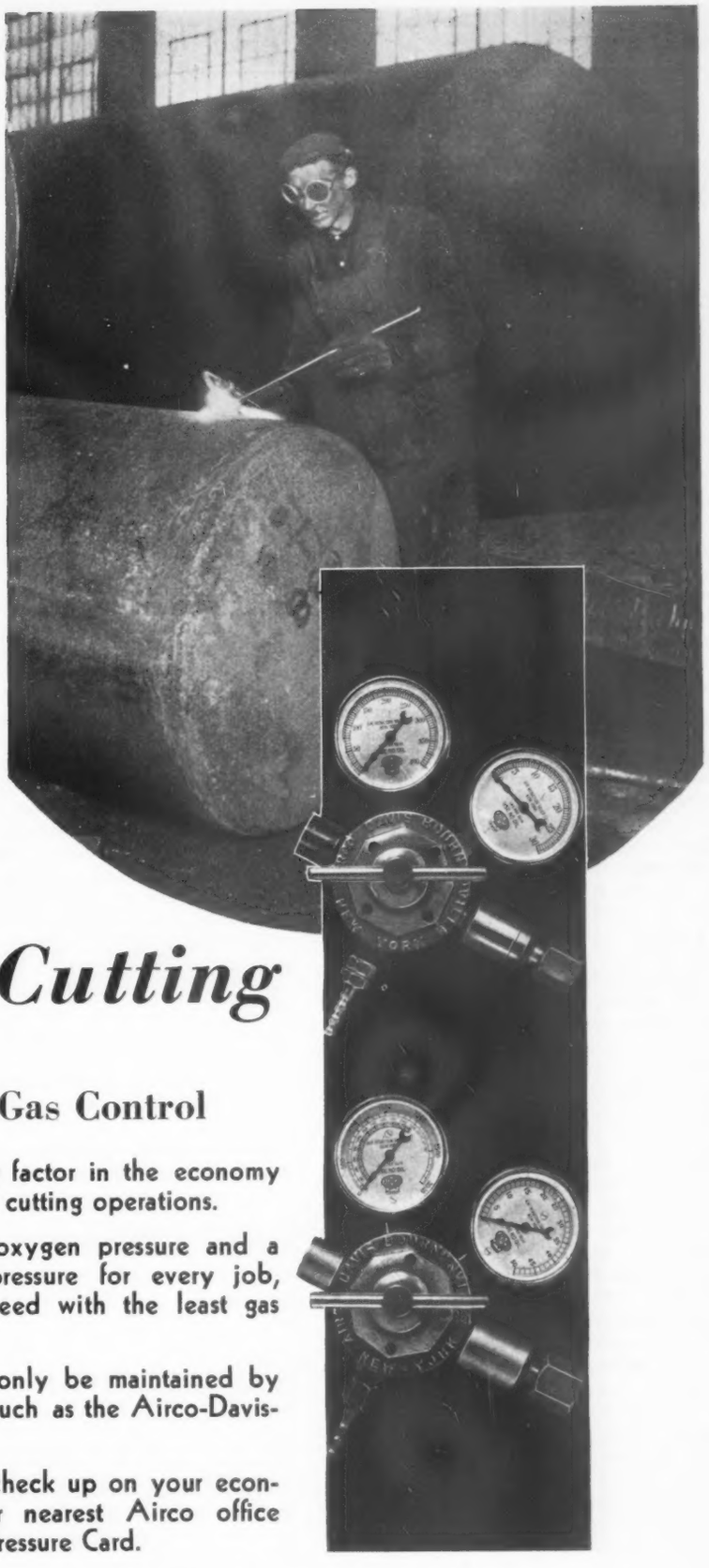
Mon. ave.	Act. Fur. on last day	Pig iron	Steel ingots and castings
1913	**338***	**855,000**	**638,600**
1928	132	550,800	710,000
1929	162	632,400†	803,000†
1930	76	516,400	608,200†
1931			
Feb.	81	318,200	486,400
March	81	357,100	500,100
April	78	323,200	397,400

(*) Average for year.
†Revised figures.

Belgian Trade Steady

Brussels—Exports of pig iron and other iron and steel products from Belgium and Luxemburg in February gained over January. Imports of pig iron in February declined from January and imports of other iron and steel products gained over January. Comparisons follow, in metric tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron	Other iron and steel	Pig iron	Other iron and steel
1928	45,910	38,000	8,240	380,000
1929	56,150	37,000	10,090	394,500
1930	33,350	28,000	9,600	343,400
1931				
Jan.	25,432	28,400	7,980	285,300
Feb.	22,943	30,650	11,015	321,035



An Important Item

In Your Daily Welding & Cutting

Accurate Gas Control

Saving gas is a daily factor in the economy of your welding and cutting operations.

There is a correct oxygen pressure and a correct acetylene pressure for every job, to get the best speed with the least gas consumption.

These pressures can only be maintained by accurate regulators such as the Airco-Davis-Bournonville.

Now is the time to check up on your economies. Write your nearest Airco office listed for a Pocket Pressure Card.

Baltimore
Bettendorf, Ia.
Birmingham
Boston
Buffalo
Charlotte
Chicago
Cincinnati
Cleveland
Dayton
Detroit
Jersey City
Kansas City
Los Angeles
Louisville
Milwaukee
Minneapolis
New Orleans
Oklahoma City
Philadelphia
Pittsburgh
Portland, Ore.
Richmond
San Francisco
Seattle
Shreveport, La.
St. Louis
Wheeling
Wichita, Kan.

Represented in Texas by Magnolia Airco Gas Products Co., Houston, Beaumont, El Paso, Ft. Worth, San Antonio, and Wichita Falls.

AIR REDUCTION SALES COMPANY

Lincoln Bldg., 60 East 42nd St., New York

Airco Oxygen—Airco Acetylene—Airco-Davis-Bournonville Welding & Cutting Apparatus—Supplies—National Carbide

Machinery

RECORDS of many machine tool builders and dealers show low points for the year in May—a month during which an upswing confidently had been expected. Unfavorable conditions, which became intensified in May, still prevail, important lists still being held up, railway buying failing to improve and immediate government equipment needs apparently being filled. The picture has its brighter side however. Activity is sustained in certain branches of the automotive industry, demand for grinders exists both here and abroad and substantial machine tool orders continue to be placed by Russian interests, contrary to recent expectations.

New York—Machine tool buying and inquiry continue to drag. The closing week of May was the slowest of the month with most dealers, who furthermore report May as the dullest month of the present year. Fresh inquiry is light, although a technical school at Schenectady is asking prices.

Some government work is coming out, but slowly, most of those shops and yards having purchased equipment covering immediate needs several weeks ago. Sales are limited to one or two units at a time. Some inquiry, pending for weeks, has been withdrawn and the little volume now before the market may be classed as active. Considerable of the present limited buying, however, occurs without formal request for prices.

Grinding machinery builders appear more optimistic then the general run of equipment makers, although even in this field the volume is spotty. One New England grinder building plant is running close to full schedule with business booked to sustain this rate for six to eight weeks. Ball bearing plants in the East are in some instances operating 40 hours a week, notably two which are specializing in automotive work. Production schedules as a rule, however, are erratic and dependent largely on limited spot buying. City College of New York takes bids June 8 on a 300,000-pound testing machine.

Worcester, Mass.—While domestic buying remains at a standstill, makers of grinders are busy on the continuing flow of orders placed by Amtorg Trading Corp. Norton Co., one of those having a large order, is exhibiting a new automatic grinder.

Business in lathes and drills is moderately quiet, with the exception of some machines for schools in the Middle West. Demand and inquiry from New England buyers have fallen to extremely low levels with slight indication that there will be any renewed activity for several months.

Pittsburgh—Machine tool buying has shown no appreciable change in volume over the past 30 days but has moderated from the rate of the latter part of the first quarter. Recent inquiry has been insufficient to indicate possibility of any definite improvement over the next two months, since buyers continue to defer closing on pending lists. The only live list of any size which is pending is that of Westinghouse Electric & Mfg. Co. on which no action has been taken as yet. The occasional orders which are being received usually cover single tools.

Cleveland — Reports by machine tool builders and dealers here indicate that May was a thoroughly disappointing month, in spite of active participation in what business has come out of the automotive and electrical industries. Not much is in view in the way of orders, although inquiry is sustained by a number of new and improved production machines announced recently. Certain companies maintaining sales offices in Chicago are able to point to encouraging sales in that district.

Orders for machinery for Russia continue to come in, which is surprising in view of rumors that this business was being shifted to European sources. Machinery also has been placed here and there in other industrial districts in Europe—just enough to encourage active continuation of foreign sales efforts which in many cases were on the verge of being given up for the time being at least.

Small tools and repair parts are not moving as they were. It is apparent that middle-aged machinery, repaired and retooled but not yet used, is a formidable barrier to early recovery of new machinery sales.

Chicago—Despite reports that certain machine tool builders and dealers have expressed willingness to offer price concessions on definite inquiries for machine tools, it appears that existing price lists on standard tools are scheduled to stand for the time being. The recent low prices submitted on special equipment for one of the tractor builders helped to develop rumors of probable price reductions.

Santa Fe purchased additional tools, during the week, including a press, hacksaw and electrical equipment. Industrial buying was of no consequence. There are indications that Allis-Chalmers Mfg. Co. is considering orders for the Advance-Rumely plant at LaPorte, Ind. Also there is a possibility that A. O. Smith Corp., Milwaukee, will purchase some equipment for its research work later in the summer. The purchasing committee of the Chicago board of education is expected to act on the Austin High school inquiry this week. The board is inquiring for a 32-inch of 36-inch lathe for its maintenance and repair department.

Lakeside Bridge & Steel Co., Milwaukee, has booked a contract from the Navy department for one 5-ton traveling crane at a price of $4790.

Exports of Metalworking Machinery

	April		January through April	
	1931	1930	1931	1930
Engine lathes	44	103	197	364
Turret lathes	15	35	90	150
Other lathes	74	58	251	277
Vertical boring mills and chucking machines	32	34	95	114
Thread-cutting and automatic screw machines	19	69	78	293
Knee and column type milling machines	26	35	60	138
Other milling machines	28	75	108	296
Gear-cutting machines	30	37	89	153
Vertical drilling machines	7	36	103	254
Radial drilling machines	28	20	54	87
Other drilling machines	82	118	754	882
Planers and shapers	28	48	120	164
Surface grinding machines	17	30	50	111
External cylindrical grinding machines	16	69	91	223
Internal grinding machines	2	22	107	199
Tool grinding, cutter grinding, and universal grinding machines	81	131	334	602
Pneumatic portable tools	1101	1670	3954	7038
Chucks for machine tools	711	4427	3361	11690

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

NEW LONDON, CONN.—Bureau of yards and docks, navy department, Washington, will receive bids June 16 on schedule 5821 for a diesel generator set and parts for delivery to the submarine base here.

BELCHERTOWN, MASS.—Belchertown state school will build an industrial shop with an expenditure of about $50,000. R. D. Kimball Co., 6 Beacon street, Boston, is engineer. Kendall Taylor & Co., 209 Columbus avenue, Boston, are architects.

BOSTON — Eastern Massachusetts Street Railway Co., 38 Chauncy street, plans to erect a service unit. Estimated cost, $100,000.

NORFOLK, MASS.—Department of correction, state prison colony, advises that equipment will be purchased for the sheet metal shop but other shops to be erected here will be equipped from present machinery. Structure will be 55 x 103 feet, three stories. R. D. Kimball Co., 6 Beacon street, Boston, is engineer. (Noted May 28.)

PALMER, MASS.—Wickwire Spencer Steel Co., 41 East Forty-second street, New York, is planning a rope mill addition here. Maturity is indefinite.

SQUANTUM, MASS.—A. P. Drapish will initiate production of monoplanes in a unit of the former Victory plant, employing about 25. Space of about 15,000 square feet has been leased.

WORCESTER, MASS.—Ideal Metal Products Inc. has been established here for the manufacture of metal stampings, employing about 25.

EAST GREENWICH, R. I.—Ludington Boat Corp. has started production of boats, employing 60.

PROVIDENCE, R. I.—Welsh Mfg. Co., manufacturer of metal specialties, has secured a 3-story building and will move operations to the new location soon.

New York

BROOKLYN—Globe Brass Foundry & Pattern Corp. has been incorporated with $10,000 capital by P. M. Jeffrey, Jamaica, N. Y.

GOUVERNEUR—Village board of trustees plans waterworks improvements and will install auxiliary equipment and pumping machinery. Bond issue for $120,000 is being arranged.

NEW YORK — Automatic Brake Corp. has been incorporated with $75,000 capital by Denman, Bevier & Scotti, 36 West Forty-fourth street, to make automotive devices.

ROCHESTER—Water department, city hall, will purchase pumping equipment for the new waterworks station at Rondout creek. Total cost is estimated at $1,125,000.

SYRACUSE—Roth Bros. Metal Co. has been incorporated with $20,000 and 100 common shares by B. E. Bernstein.

New Jersey

ELIZABETH—General Welding Shop Inc. has been incorporated with $125,000 capital by Milton B. Levin, Newark, N. J.

JERSEY CITY—Chamberlain Aircraft Corp. has been incorporated with 2500 common shares by Appleton, Rice & Perrin, 63 Wall street, New York, to manufacture aircraft.

NEWARK—Uptown & Union Iron Works Inc. has been incorporated with $50,000 capital by Max M. Plotkin, 10 Harding terrace.

NEWARK — Commercial Electric & Machine Co. has been incorporated with 1000 common shares by Sorg, Duncan & Bailey, 1060 Broad street.

TRENTON—Trusty Autotmatic Oil Burner Co. has been incorporated with $100,000 capital by Herbert Ahern, to manufacture oil-burning equipment.

WEST ORANGE—Board of education, Northfield avenue, has authorized preparation of preliminary plans for a $550,000 junior high school, to include shop room, to be built on Gilbert street.

Pennsylvania

ALTOONA—Klesius & Sheedy Inc. has been incorporated with $10,000 capital by R. J. Sheedy, 324 Twenty-eighth avenue, to manufacture heating apparatus.

CAMPHILL—L. B. Smith Inc. is reported to be inquiring for portable air compressors, 60 x 160-horsepower diesel engines and other items.

GLENSIDE — Borough of Upper Moreland township plans a new sewage treatment plant and pumping station. Albright & Mebus are preparing plans.

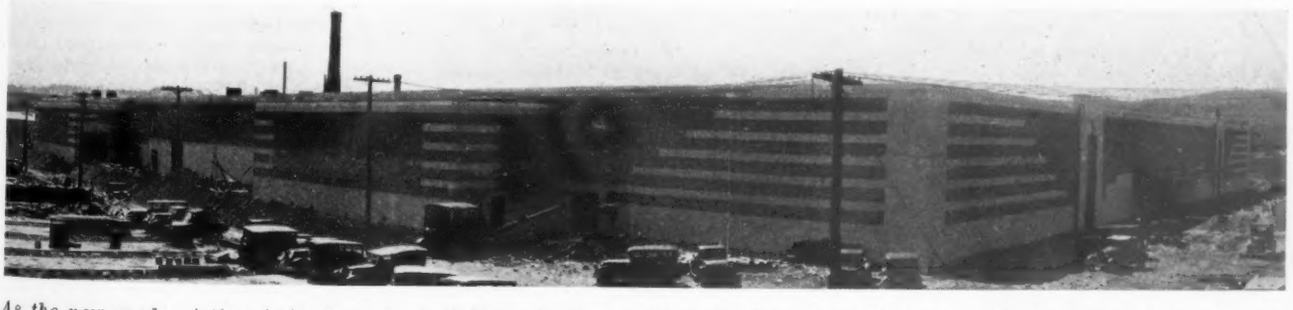
MT. JEWETT—Interstate Window Glass Corp. will remodel its plant and install new equipment for the manufacture of glass by the flat process.

PHILADELPHIA—Harold E. Trent Co., 439 North Twelfth street, has leased 6000 square feet of plant space at Fifty-fourth and Poplar streets. Company makes electrical appliances.

PHILADELPHIA—Ford Bros. & Co. has been incorporated with $5000 capital by Lawrence S. Ford, 6007 Clifford terrace and Albert Bourgeois, 5840 North Fairhill street, to manufacture and deal in sheet metal, castings and forgings.

PHILADELPHIA—J. F. Dugan, director, department of public welfare, city hall annex, is receiving bids for construction of a shop for the house of correction. P. H. Johnson, Architects building, is architect. Estimated cost, $500,000.

ST. NICHOLAS—Philadelphia & Reading Coal & Iron Co., Reading



As the new modernistic windowless plant of Simonds Saw & Steel Co. Inc., East Fitchburg, Mass. now appears. Change in plans is said to have resulted in delay in putting the plant into operation. This will defer abandonment of the old Fitchburg plant and units in other places. With no windows or skylights, the plant is designed for artificial lighting, air conditioning and elimination of noise

terminal building, Philadelphia, plans to build a coal breaker near here, with output of 12,500 tons daily. Company engineers are in charge. Approximate cost, $1,000,000.

Ohio

CINCINNATI—Plant of Cincinnati Stamping Co., 26 West McMicken avenue, recently was damaged by fire. Loss is estimated at $10,000. Company manufactures furnace pipe and fittings. Frank Hoersting is vice president.

CLEVELAND — Steel Laboratories Inc. has been incorporated with 250 no par shares by Siegel & Siegel, Engineers building.

CLEVELAND—Mon-Arc Welder & Electric Co. has been incorporated with 250 no par shares by Alexander S. Brien, 2105 Guarantee Title building.

CLEVELAND — Shaker Heights, E. P. Rudolph clerk, has plans for storage and equipment building to cost $75,000. Charles Schneider, 1836 Euclid avenue, is architect. Site is to be selected.

RAVENNA—Browning Crane Co., North Diamond street, is considering installation of a steel foundry. Proposed addition would employ 50. Company will continue production of gray iron. M. P. Richard is general manager and Leon Hubbell vice president.

SALEM—Mullins Mfg. Co., manufacturer of auto bodies and motor boats, proposes to install a continuous electrical porcelain enameling furnace, welding devices, presses, conveyor machinery and sand blasting units. Cost is estimated at $175,000.

TOLEDO — General Motors Corp., General Motors building, Detroit, is reported to be negotiating for the plant of the National Malleable & Steel Castings Co., with site of 60 acres.

ZANESVILLE—Amos & Stabler Foundry Co. has been established at 241 Brookover avenue by C. L. Amos and P. H. Stabler, for the production of gray iron castings.

Indiana

AUBURN—U. G. Louder has let contract to Yoder & Lautzenheiser for a power plant addition, equipment for which will be purchased.

MUNCIE—Delaware county board of commissioners, W. M. Shafer auditor, court house, has plans for installation of three new boilers and one stoker. Plans by Houck & Smenner, 108 East Washington street, architects, have been completed. Vevington-Williams Inc., 1139 Indiana Pythian building, Indianapolis, Ind., is engineer.

TERRE HAUTE—Highland Iron & Steel Co. advises through J. B. Schlossberg, plant manager, that the company has no plans for an additional plant building, but increased demand will necessitate addition of two furnaces in the mechanical puddling department and rearrangement of present equipment. (Noted May 28).

Michigan

DEARBORN—Thornton Engineering Co. Inc., 224 York boulevard, has been incorporated with 5000 no par shares by Ray Thornton, 1776 York boulevard, to manufacture and deal in motors, gas and electrical machinery.

DETROIT—General Electric Co., River road, Schenectady, N. Y., is reported to plan a branch plant here, to be built at a cost of $300,000.

DETROIT—Metalclad Products Inc., 1450 Buhl building, has been incorporated with $10,000 capital by R. A. Haigh, Harrison, Detroit, to manufacture and operate metalclad products.

DETROIT—Rex Foundry Co., 3562 East Palmer avenue, has been incorporated with $5000 capital by H. A. Petrequin, 10967 Chelsea avenue, to manufacture metal products.

DETROIT—Public Lighting commission, 138 East Atwater street, proposes to build a power substation on Grand River avenue at a cost of $215,000 and a storage and shop unit to cost approximately $45,000.

DETROIT—Gillian Mfg. Co., 620 East Hancock avenue, advises through I. T. Gillian that the company will not make any purchases of equipment at the present time, a plant having been leased at the above address. Company will manufacture metal and other products used in automobile, aviation and similar industries. (Noted May 28.)

MENOMINEE — Warehouse and kilns are included in structures to be rebuilt by J. W. Wells Lumber Co., following a recent fire.

SAGINAW—Plant expansion being undertaken by Saginaw Malleable Iron division of General Motors Corp. will increase capacity to 75,000 tons of castings, an expansion of about 50 per cent. New plant unit will be 68 x 512 feet. David O. Thomas is general manager of the plant.

WYANDOTTE—Pittsburgh Forgings Co., Grant building, Pittsburgh, with plant at Coraopolis, Pa., is reported to have purchased a site of 40 acres in Ecorse township for future construction of a plant. Maturity is indefinite.

Illinois

ARMINGTON—Pratt Mfg. Co. has been established here for the production of camp stoves. Plant has been acquired.

CHICAGO—Plant of National Lead Co., 921 West Sixteenth street, recently was damaged by fire, with loss estimated at $25,000.

CHICAGO—New boiler house will be erected by Swift & Co., Union stock yards. Building permit has been issued for structure to cost $75,000.

CHICAGO—U. S. Motor Steamer Co., 2460 South Michigan avenue, has been incorporated with $20,000 capital by Henry A. Newman, 10 South LaSalle street, to deal in motors.

CHICAGO—Harper-Wyman Mfg. Co., 1364 East Seventieth street, is building a 1-story plant addition, 60 x 60 feet, to cost $25,000 with equipment. Company manufactures gas range equipment.

CHICAGO—Matchless Metal Products Co., 840 West Forty-ninth place, has awarded contract for the remodeling of its plant, including an addition, 30 x 70 feet, to second floor. Kocher & Larson, 6405 South Halsted street, are architects.

EAST ST. LOUIS—Illinois Central railroad, A. F. Blaess chief engineer, 135 East Eleventh place, Chicago, proposes to erect a one and 2-story warehouse, 100 x 800 feet, on Front street here. D. F. McLaughlin, care of owner, is architect. F. R. Judd, 700 Dowie building, Chicago, is engineer. Cost is estimated at $300,000.

GREAT LAKES—Bureau of supplies and accounts, navy department, Washington, will receive bids June 16 on schedule 5848 for one 6-inch bench type grinder and one 10-inch pedestal type grinder and buffer.

TRENTON — Trenton chamber of commerce is in communication with interests represented by Walter Glaathaar, East St. Louis, Ill., and is negotiating for establishment of a foundry here. Proposed industry would produce furnaces and stoves, employing about 150. Plant building is being arranged for and construction of an addition considered.

Southern States

FAIRFIELD, ALA.—Plant of the American Tar Co. recently was damaged by explosion and fire. Refinery and tanks were included in the loss.

DOVER, DEL.—Richards Fabricating Co. has been incorporated with 250 common shares by Capital Trust Co. of Delaware to deal in steel products.

WILMINGTON, DEL. — Busher & Gibbs Plow Co. has been incorporated with 200,000 common shares by Corporation Trust Co. to deal in machinery.

WASHINGTON—Bureau of yards and docks, navy department, Washington, will receive bids June 10 on specification 6389 for installing stokers and boilers at the Washington navy yard.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids June 23 on schedule 5805 for 162 portable electric drills and 8 portable electric grinders, for delivery to various naval supply depots.

FT. PIERCE, FLA.—Ft. Pierce Airways Inc., Capt. F. M. Upton manager, proposes to build a hangar unit here, with capacity of 15 planes.

OCALA, FLA.—City, J. R. Martin mayor, will receive bids for municipal light and power plant equipment July 7.

TAMPA, FLA.—Utility Battery Mfg. Co. has been incorporated by H. D.

Wentworth, 416 Tampa street, to manufacture batteries and other products.

LOUISVILLE, KY.—U. S. air corps, chief of material division, Wright field, Dayton, O., will build a group of buildings at Bowman field, recently noted as being improved by the city. Group includes hangar, shop, warehouse and operations buildings. Total estimated cost, $85,000. (Noted March 19.)

LUDLOW, KY.—Carran Foundry & Smelting Works Co. has been incorporated with $100,000 capital by M. C., Sam S. and Jack B. Carran.

NEW IBERIA, LA.—Mining plant will be built near here by Jefferson Lake Oil Co., Arthur Barba president, New Orleans Bank building, New Orleans. Company will produce sulphur.

NEW ORLEANS—Sewerage & Water board, Bryson Vallas general superintendent, will receive bids July 15 for two 450-horsepower vertical synchronous motors and two 250-horsepower vertical synchronous motors for stations 6 and 7.

HOLLY SPRINGS, MISS.—City council is considering proposal to install auxiliary equipment and a diesel engine unit.

MEMPHIS, TENN.—Dixie Greyhound Lines Inc. will lease a structure to be erected here by L. E. McKnight, to be used as bus terminal and shop for repair of motors and brakes. Unit will be 117 x 316 feet and will be constructed at High and Washington streets and Adams avenue. Jones, Furbringer & Jones, Porter building, are architects. Total cost is estimated at $175,000.

FREDERICKSBURG, VA.—Collins Flashlight Corp. of Virginia plans to build a plant, 40 x 60 feet, for the manufacture of flashlights and electrical devices. Company was organized with C. B. Collins as president.

HAMPTON ROADS, VA.—Bureau of supplies and accounts, navy department, Washington, will receive bids June 16 on schedule 5803 for starting motors, distributors, generators and spare parts.

Missouri

CARUTHERSVILLE—U. S. Engineer office, 1006 McCall building, Memphis, Tenn., will receive bids June 17 for 1,500,000 pounds of steel strand cable.

JEFFERSON CITY—Missouri general assembly has appropriated $190,000 for a power plant at the state school at Marshall, Mo., and $292,000 for a light, heat and power plant at the state hospital at Fulton, Mo.

KANSAS CITY—J. W. Steele & Co. has been incorporated by A. O. Long, 610 West Sixty-seventh street, to manufacture mechanical cleaning devices.

KANSAS CITY—National Air Transport Co., 5936 South Cicero avenue, Chicago, has let contract to Austin Co., 16112 Euclid avenue, Cleveland, for construction of the hangar recently noted as planned here. Cost has been placed at $150,000, instead of as previously announced. Unit will be 121 x 148 feet. (Noted April 23.)

ROBERTSON—Bureau of supplies and accounts, navy department, Washington, will receive bids June 16 on schedule 5817 for a 21-inch sliding head drill machine.

ST. LOUIS—Premier Pulley & Weatherstrip Co. has been incorporated with $15,000 capital by Lewis S. Haslam, Telephone building.

Oklahoma

HOMINY—City council plans construction of a power plant. V. V. Long & Co., Colcord building, Oklahoma City, Okla., are consulting engineers. Estimated cost, $125,000.

Texas

DRYDEN—Col. Grayson V. Heidt, quartermaster corps, Ft. Sam Houston, San Antonio, Tex., is in charge of construction of an air corps operations building here.

FT. WORTH—W. C. Steel Ball Table Co., 106 South Sylvania street, will build a plant, 100 x 180 feet, for the manufacture of steel billiard tables. C. G. Collins is general manager.

FT. WORTH.—Anderson - Tharp Iron Works, 1512 East Front street, advises through James T. Anderson that the company has leased a plant and office building at the above address and has secured equipment for present needs. Company will manufacture ornamental and miscellaneous iron and wire items and will distribute metal doors and windows. T. C. Anderson is president. (Noted May 28.)

LEGION—U. S. Veterans' bureau, care of P. T. Lundquist, plans erection of an automotive shop, 60 x 160 feet, to cost $60,000. Equipment will be installed.

SAN ANTONIO—Automatic Signal Service Corp. has been incorporated with $50,000 capital by Ellis I. Haynes, to manufacture automatic signal devices.

SAN ANTONIO—Capt. A. S. Harrison, constructing quartermaster, Ft. Sam Houston, will receive bids July 16 for two steel hangar units, each 110 x 220 feet, with annexes and compressor rooms. Cost is estimated at $240,000.

WILLOW SPRINGS—Globe Oil Tools Inc., Los Nietros, Calif., will operate a machine shop here for repair of oil field tools. J. H. Schuler is manager.

Wisconsin

JEFFERSON — Plant of Valerius Corp., 80 x 300 feet, recently was virtually destroyed by fire. Loss is estimated at $75,000. Company manufactures soda fountains and refrigerating systems. William Mayer is president.

LAKE MILLS—City light and water commission is considering construction of a generating plant.

MILWAUKEE — Geuder, Paeschke & Frey Co., 38 Fifteenth street, manufacturer of stampings and metalware, has let contract to Meredith Bros. Co., 121 East Washington street, for a 1-story plant addition, 60 x 140 feet.

Minnesota

STILLWATER—State commission of administration and finance, 10 Capitol street, is having plans prepared for a foundry addition at the state prison here, recently noted as being considered. Ellerbe & Co., 525 Minnesota building, are architects. Cost is estimated at $35,000. (Noted Jan. 29.)

South Dakota

VERMILION—City council has authorized preparation of plans for construction of a light and power plant. Cost, with equipment, $85,000.

Iowa

CEDAR RAPIDS—Iowa Railway & Light Co. will install new equipment in an addition to its steam power plant. Company engineering department is in charge. Approximate cost, $89,000.

Colorado

DENVER—Hosek Mfg. Co., 416 West Warren avenue, is considering erection of a foundry addition, 40 x 75 feet, for the production of brass, bronze and aluminum castings. Overhead electric cranes, core ovens and gas furnaces are planned for installation. H. F. Hosek is president and general manager.

Idaho

CASCADE—Warehouse and machine shop will be erected here by National Forest office.

Pacific Coast

BRAWLEY, CALIF.—Board of city trustees proposes light and power plant extensions. Burns-McDonnell-Smith Engineering Co., Western Pacific building, Los Angeles, is engineer. Cost is estimated at $150,000.

LOS ANGELES—Fisher Governor Co., manufacturer of steam specialties and mill supplies, Marshalltown, Iowa, is establishing an assembly plant here at 1015 Santa Fe avenue. Ray McCoy will be plant manager.

OAKLAND, CALIF.—American Iron & Bronze Works is establishing operations at 1080 Fifth street, with 4000 square feet of floor space. Paul Romack and R. W. Weeks are interested in the company. Products will include ornamental iron and bronze work.

SAN DIEGO, CALIF.—Bureau of supplies and accounts, navy department, Washington, will receive bids June 16 on schedule 5827 for one 24-speed lathe.

SAN RAFAEL, CALIF.—Construction quartermaster, care of H. B. Nurse, has preliminary plans for a group of buildings at the bombing

base here, as a part of a three year building program. Warehouses and shops will be included. Total cost is estimated at $5,000,000.

SANTA BARBARA, CALIF.—General Western Aero Corp. has let contract for construction of a plant near here for the manufacture of airplanes and parts. Approximate cost, $30,000.

PORTLAND, OREG.—Spokane, Portland & Seattle railway will receive bids June 15 through J. Dickson, superintendent of motive power, for supplies, to include boiler plate, tubes and miscellaneous items such as bolts, nuts and castings.

BREMERTON, WASH.—Bureau of supplies and accounts, navy department, Washington, will receive bids June 16 on schedule 5828 for one motor-driven tool grinder and cutter.

CHEHALIS, WASH. — Borden Co. will install canmaking equipment in its local plant immediately.

Dominion of Canada

VANCOUVER, B. C.—West Kootenay Power & Light Co. has filed application for a fifth power site on the Kootenay river. The proposed project would develop an additional 30,000 horsepower.

VANCOUVER, B. C. — Vancouver Wire Ropes Ltd., Industrial island, has been acquired by Wright's Canadian Ropes Ltd., affiliated with Wright's Ropes Ltd., Birmingham, Eng. Local plant will be improved and new equipment will be installed for the manufacture of wire rope for the Canadian distribution of the parent company.

LONDON, ONT.—Public utilities commission has plans for an addition to the municipal workshop on Horton street. Estimated cost, $40,000.

OAKVILLE, ONT.—City council has authorized a committee to purchase a lift pump in connection with sewer improvements.

SIMCOE, ONT. — Norfolk Fruit Growers Association is making plans for an addition to its cold storage plant. Estimated cost, $100,000.

TORONTO, ONT.—Noma Electric Co. of Canada Ltd., affiliated with Noma Electric Corp., 340 Hudson street, New York, has secured premises at 179 John street, and will install equipment immediately for the manufacture of electrical supplies.

TORONTO, ONT.—Baldor Electric Co. of Canada Ltd., 104 Adelaide street east, advises through W. H. Cooper, manager, that 4000 square feet of floor space have been secured for initial operations. Company will be controlled by Baldor Electric Co., St. Louis, which is formulating plans. (Noted May 28.)

GRANBY, QUE.—City council is considering purchase of a centrifugal pump for the municipal waterworks plant. J. H. Bergerson, city hall, is clerk.

MONTREAL, QUE.—Canada Wire & Cable Co. Ltd., 940 Inspector street, will start operations in its new East Montreal plant soon.

MONTREAL, QUE. — Montreal Light, Heat & Power Co., 107 Craig street west, plans extensions to a substation at Atwater and Verdun avenues at a cost of $500,000.

MONTREAL, QUE.—White Motor Co. Ltd. will start production soon, manufacturing motor trucks for the Canadian market. L. M. Hart, vice president, will direct the plant.

VERDUN, QUE.—City, H. Hadley engineer, is having plans made for extensions to the filtration plant. Approximate cost, $400,000.

MAPLE CREEK, SASK.—Saskatchewan Power Commission, L. A. Thornton, chairman, Regina, Sask., is considering construction of a new power plant here and installation of a diesel engine unit. Estimated cost, $26,000.

New Trade Publications

ALLOY CASTINGS—Dodge Mfg. Co. Ltd., Toronto, Ont., presents in current bulletin advantages of castings of Meehanite metal. It covers the properties, applications, physical properties and performance of this metal.

ELECTRICAL DEVICES — Allen-Bradley Co., Milwaukee, has issued a series of new and replacement bulletins for its loose-leaf catalog. They cover a wide range of electrical controlling apparatus included in its line.

OIL BURNERS—Low pressure oil burners of three types, suited to varying operating conditions are featured in a current bulletin, No. 2E, by Ryan, Scully & Co., Philadelphia. The text is illustrated.

MATERIAL HANDLING—Elwell-Parker Electric Co., Cleveland, has issued an illustrated bulletin devoted to the subject of materials handling on skids. It is largely made up of illustrations of actual use in a variety of industrial applications.

SHEET METAL PARTS—A catalog of its fabricated and stamped sheet metal parts has been issued by the Stolper Steel Products Corp., Fond du Lac avenue and Thirty-third street, Milwaukee. It covers a wide range of products in this line.

STEEL LOCKERS—Durabilt Locker Co., Aurora, Ill., illustrates in a current bulletin its line of school shop storage cabinets. The shell is devised to be fitted with a series of shelves, partitions, boxes, drawers, trays and other units to fit the need of each user.

ELECTRIC MOTORS—A bulletin, No. 165, by the Wagner Electric Corp., St. Louis, is devoted to squirrel-cage motors. Seven types are discussed as to starting torques, starting currents and cost. Tables and charts present the comparisons. Construction details also are illustrated.

ELECTROLYTIC PICKLING — Hanson-Van Winkle-Munning Co., Matawan, N. J., has prepared for distribution a booklet on its process for electrolytic pickling. It deals with the application of electric current in pickling operations by a method that obviates former disadvantages.

INDUCTION MOTORS — Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., in Leaflet 20385-A presents its type CS squirrel-cage induction motor, a new W-frame motor with interchangeable mechanical and electrical parts. Modifications and special applications made possible by interchangeability of parts are described and illustrated.

INDUSTRIAL HEATING — Reznor Mfg. Co., Mercer, Pa., has issued a bulletin describing its gas-fired warm air forced circulation heaters adapted to factory, auditorium, or warehouse heating. Designs and construction are illustrated and notes on operation and performance given. A second booklet is devoted to gas fired warm air heating and ventilating units.

INDUSTRIAL TRACTORS — A recent bulletin from Clark Tructractor Co., Battle Creek, Mich., illustrates and describes its 4-wheel, gasoline-powered industrial tractors. Gasoline-powered shovels and cranes for factory use also are covered. The shovel is recommended to foundries for material handling, clean up, and waste removal. Sweepers and snow plows also are adapted to the tractors.

PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J., has issued the following bulletins: W-312-S4, centrifugal pumps, single-stage volute; W-312-S5, centrifufal pumps, single-stage volute; W-312-S7, centrifugal pumps, single-stage volute; W-312-S8, centrifugal pumps, single-stage volute; D-112-S13, horizontal duplex double plunger steam pump; S-2001-A, industrial chromium plating.

V-BELTS—A catalog on its V-belts has been issued by L. H. Gilmer Co., Philadelphia. It is in two parts, the first devoted to theoretical and practical illustrations of V-belts and their operation in multiple drives for various classes of service. The second section is engineering in character, introducing simple and original formulas for all V-belt calculations, detailed tables of drives and a chart for determining center distances, belt lengths and other data.